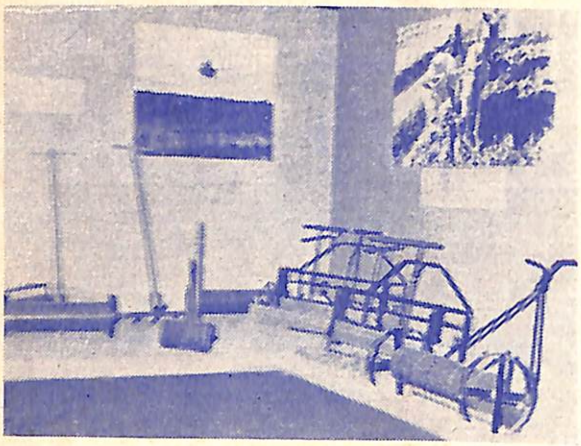
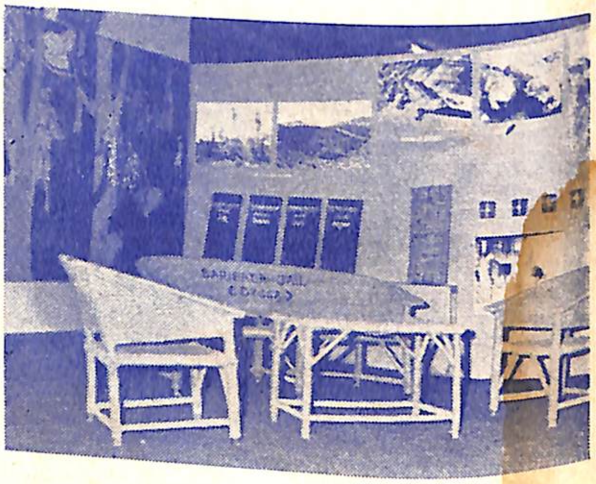
# ORISSA REVIEW

NOV • DEC • 1977



Indigenous implements displayed

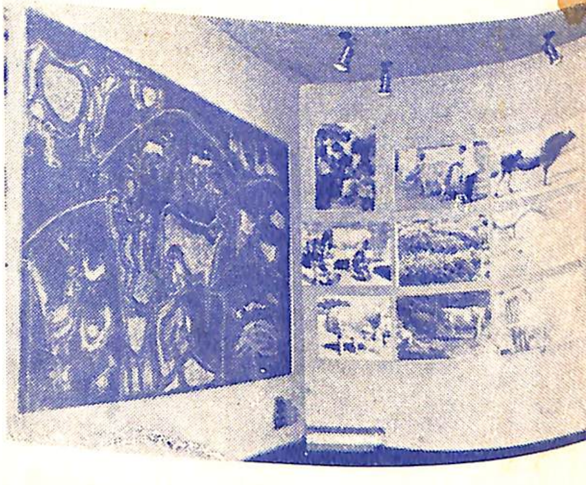
Sofa set from Sabai Grass



## GLIMPSES OF ORISSA PAVILION IN AGRI-EXPO' 1977

Tribal Section

Animal Husbandry Section



# ORISSA REVIEW

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ORISSA REVIEW seeks to provide a condensed record of the activities and official announcements of the Government of Orissa and other useful information. Many items appear in summarised form. Such items should not be treated as complete and authoritative versions.

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सत्यमेव जयते
ORISSA STATE
**SHRI NILMONI ROUTROY**
CHIEF MINISTER

BHUBANESWAR

Date November 18, 1977

## MESSAGE

I am happy to learn that a special issue of the Orissa Review under the title 'AGRI-EXPO, 77' is being brought out by the Home (Public Relations) Department on the occasion of the National Agricultural Fair which is being held at New Delhi. When the present Government's plans and programmes are more rural and agriculture oriented, this special issue with articles and information pertaining to agricultural development and allied subjects will go a long way in projecting the State's efforts in this direction.

I wish the venture a success.

N. Routroy

( N. Routroy )

# What we can do for the development of Agriculture in Orissa

Shri PRAHALLAD MALLICK

It is obvious that man entered into the first step of civilization on the day he could enable himself to prepare his own food. On that very day he could be aware of his creative urge. He did not collect food for himself, as other animals did, on the contrary he produced it. His scientific insight and imaginative outlook expanded ever more. At last, he discovered his culture in his toil for agriculture. So, culture and agriculture evolved as complementary to each other. Hence, neglect of agriculture, is to invite decadence of Culture. Our State which is the abode of a rich culture, has been able to maintain it through ages of an agro-oriented evolution of civilization.

The economic policy of Orissa mainly based now on agriculture. Directly and indirectly, eighty per cent of people of the State depend upon agriculture. 76 per cent of our working population fully depend on agriculture for their maintenance; whereas the development in agriculture has not yet been advanced. The main object of our Government is now to give emphasis on the rapid progress of the agriculture and for this, we are going to take up certain steps. In our last year budget, a sum of rupees 507·99 lakhs in Central Sector and 494 lakhs in State Sector had been estimated for the agriculture. This year, for the first time, we have increased the amount up to Rs. 837·00 lakhs and Rs. 711·00 lakhs respectively. Paddy is our principal crop. We are going to replace the "long-duration-rice variety" by "short-duration-high-yielding varieties". Our lands are suffering continuously from drought each year. So, we have decided to cultivate a short-term high-yielding variety paddy during rainy season. According to the World Bank Scheme, we are distributing the seed packets to the cultivators through the agricultural field workers.

Besides, we would utilise 11 lakh 3 thousand acres of land to enhance the production of oil-seeds. We have also prepared special plan programmes to gear up the production of pulses. In addition to this, to plant orchards especially in the hilly areas, two acres of land each have been given to tribal and under-developed families and the Government of India have agreed to sanction Rs. 300 each as subsidy in favour of promising agriculturist for the cultivation of coffee plants in the areas where measures have been taken by the Soil Conservation Department to prevent soil erosion.

Along with the development of agriculture, steps are being taken for the development of dairy farming. Farmers are also being encouraged to purchase milchy cows and to start poultry farming with loan assistance with a view to supply milk and eggs to nearby towns. In toto, although agriculture had been given due importance previously, still the achievements was far from the desired goal. In view of this we are preparing multiphased plans for rapid development of agriculture and our endeavour will remain relentless in this direction to take Orissa to the enviable apex position in respect of agricultural production in the country within the foreseeable year.

Estimates reveal that the total number of agricultural families in Orissa stand nearly at 36 lakhs 72 thousands. The people taken into the Co-operative fold out of these are as follows—

| | |
|---|---|
| 1974-75 .. .. | 1,710,000 |
| 1975-76 .. .. | 2,027,000 |
| 1976-77 .. .. | 2,190,000 |

and we have fixed a target to take in another 2 lakhs and 47 thousand members more for the year 1977-78 in addition to 2,190,000 members taken earlier.

We have also fixed the target to provide loan on long-term and short-term basis to the concerned farmers as follows:—

| | |
|---|---|
| 1974-75 .. | 13 crore 86 lakh of rupees |
| 1975-76 .. | 16 crore 21 lakh of rupees |
| 1976-77 .. | 16 crore 21 lakh of rupees |
| 1977-78 .. | Nearly 25 crore of rupees. |

Most of the farmers have dug their wells with the help of the loan taken from the Co-operative Banks. Sanction for rupees 164 thousand was accorded for dug-well schemes by the end of June 1977. Out of these, 66 thousand wells have been dug so far. These wells would provide irrigation facilities in more than 60 thousand acres of land. This is a matter of gratification that these works could be completed within a year.

With a view to providing more irrigational facilities in the Ganjam district, it is now proposed to have a reservoir in the river RUSIKULYA.

At present 44 Irrigational Projects located in the different districts of the State are under execution and instructions have been issued to investigate another 47 new projects in the State.

A sum of rupees 408 crores have been proposed to be spent during the sixth plan period for irrigation. Similarly, we have also proposed flood protection schemes on rivers Brahmani, Baitarani, Subarnarekha, etc. We are preparing a plan with a financial involvement of Rs. 100 crores in respect of flood control for the Sixth Plan period.

The irrigation potential created through the medium and major irrigation projects is about 90 lakh acres in our State. Whereas only 18 lakh acres of land have been irrigated so far through the major and medium irrigation projects. During the Sixth Plan period Government of India, it is understood, have planned to provide irrigation facilities to 1·5 crore acres of land. Accordingly, we propose to have a programme to provide irrigation facilities to 15 lakh acres of land during the Sixth Plan period.

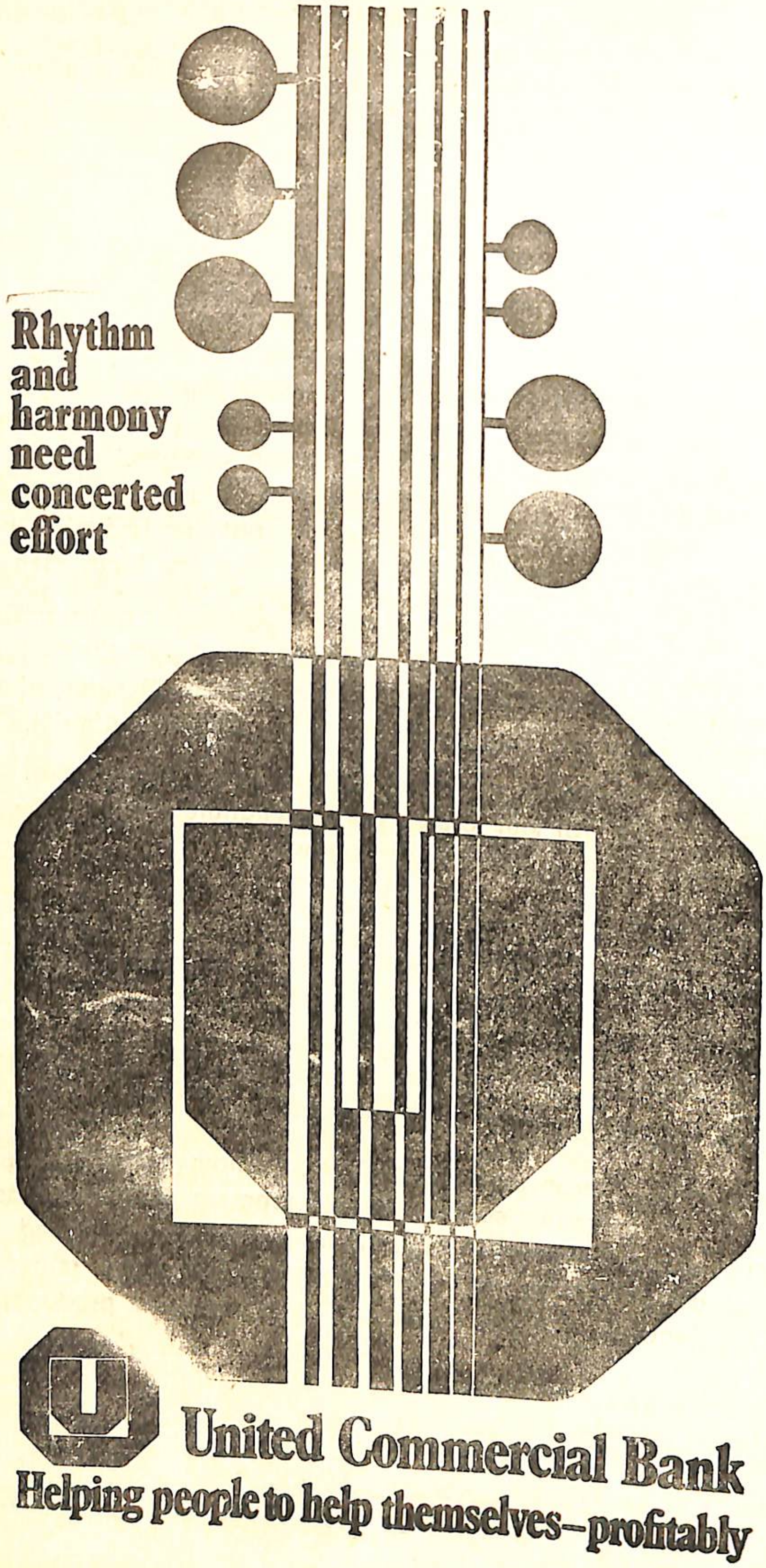
The Poteru Irrigation Project, now under execution in Koraput district will provide irrigation facilities to nearly 2 lakh acres of land and the Upper'Kolab Project will irrigate about three lakh acres of land both in Rabi and Kharif. Besides, the Indravati Project will also provide irrigation to 3 lakh acres in Kalahandi district.

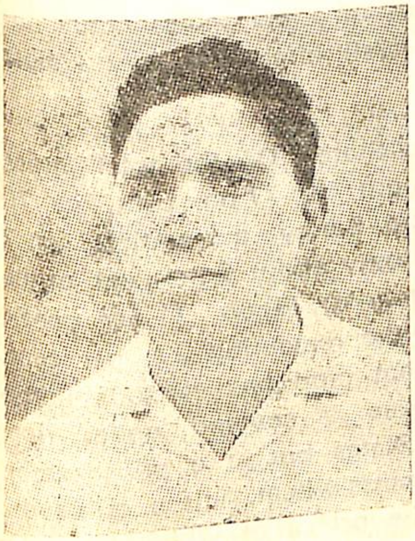
The water resources of Orissa is one-tenth of the water resources of India. To utilise the vast water resources of our State, the expenditure incurred by the State Government during different plan period is as follows:—

1. First Five-Year Plan—Rs. 55·28 crores
2. Second Five-Year Plan—Rs. 20·00 crores
3. Third Five-Year Plan—Rs. 26·22 crores
4. Fourth Five-Year Plan—Rs. 20·89 crores
5. Fifth Five-Year Plan—Rs. 96·00 crores

Even then, a considerably large tract of lands go without water. In order to fill up the inadequacies in the irrigation sector, our Government is thinking to provide Rs. 408 crores for this sector during the Sixth Plan period. It is hoped that with the co-operation of all concerned we will be able to achieve our target and our State will occupy a respectable position in regard to agricultural production.

Minister, Agriculture &
Co-operation, Orissa.


Rhythm
and
harmony
need
concerted
effort
United Commercial Bank
Helping people to help themselves—profitably
UCOC-103



# THE PATTERN OF AGRICULTURAL DEVELOPMENT IN ORISSA

**Dr. B. MISRA**

During the last decade or so, huge investments have been made in agriculture so as to increase the area of H. Y. V. or consumption of chemical fertilizers. For example, the area planted to H. Y. V. seeds has grown from a very small figure in 1964-65 to over 400,000 hectares in 1974-75. Fertilizer consumption has grown dramatically over the ten year period; it was up over 600 per cent from 1964-65 to 1973-74. All the same, there is no break through in agriculture, modernization of agriculture being confined only to a few cultivators in the State. Obviously we have started from a scratch. The following trends show that the change in technology is extremely slow:—

(1) To a considerable extent agriculture in Orissa means the growing of Paddy, which occupies 70 per cent of the cropped area. Orissa's economy is therefore heavily dependent on rice production, and rice production has been constant over the last ten years. Total population has grown 24 per cent from 1965 to 1975; using three year averages centred on 1966 and 1974, total food grain production has increased only 11 per cent using the same three year averages, per capita gross production declining by 7 per cent. This decline means farm families have less either to consume at home or sell in the market, including a decline in real income.

(2) Modern inputs which have changed the base of agriculture in other States have hardly produced any impact in Orissa. The entire rice area covered by H. Y. V. is less than 10 per cent. OVer 95 per cent of rice is grown during Kharif. There is hardly any

technological change in kharif rice. The consumption of chemical fertilizer is far below the national average. it is about 7 to 8 kgs per cropped hectare compared to the national average of about 15 kgs. per hectare. Similarly in regard to irrigation, only 16 per cent of the net sown area in the State benefits from irrigation which is lower than all-India average of about 22 per cent. In view of all these, the productivity of land and labour is extremely low in Orissa. For example, rice yields in Orissa are extremely low. Peak achievement has never exceeded about l ton of rice or 1·5 tons of paddy, per hectare. Yields are about twice this in Punjab, Haryana and Tamil Nadu. There has been some large percentage increases in the production of a few minor crops, but their base was so small relative to total output that overall effect has been almost negligible.

(3) There is little diversifcation of agriculture in the State. Of the total gross cropped areas of 7·4 million hectares, food crops account for 77 per cent, rice 70 per cent and other cereals like wheat, Maize, Millets and Barley accounting for 7 per cent. Pulses account for 14 per cent. This leaves only about 9 per cent of the cropped area for other crops such as oil-seeds (6 per cent), Fibers (1 per cent), Vegetables and Spices, and non-food crops account for the remaining 27 per cent. And in case of food crops, rice being the most important crop has yet to undergo a rapid breakthrough. All the same, since a larger area is covered under rice, Orissa is in a position to export rice to neighbouring States but at a price which is not sufficiently remunerative. On the otherhand, it imports wheat, pulses, oil-seeds, sugar, gur, cotton, tobacco. tea and many other crops, the prices of which are now prohibitive affecting adversely the economy of the State.

All this indicates that there is no breakthrough in Orissa's agriculture. Developmental expenditure incurred has not so far produced the necessary impetus to change the attitude of the cultivators to modernise agriculture. The important question is : what should be done to accelerate the process of change, i. e. how to produce more and more from less and less land.

**Irrigation**

The most important limiting factor for the spread of new technology is irrigation. In fact, the speed with which additional land can be converted to the new technology will depend on the rapidity with which new irrigation facilities can be constructed and here the high capital costs are likely to be a retarding factor. In view of this, we have to consider whether large-scale irrigation projects are to be taken up or small irrigation schemes including lift irrigation or dug well schemes are to be taken up in order to cover a wider area under irrigation. In view of paucity of investible resources, it does not seem desirable at the present stage to emphasise large-scale irrigation projects. Not only the capital costs of these projects are high, their gestation period is invariably long. The experiences of some of these projects show that there is a time lag between completion of projects and full utilisation. There is no synchronisation between completion of projects and supporting programme like field channels, land levelling and development of appropriate cropping pattern. Even the completion of the projects takes unusually long time. As is evident from the Fifth Plan, even though the anticipated expenditure in case of major and medium irrigation is more than what is allocated in the Fourth Plan, there has been a shortfall on the physical achievement. There are many constraints in the organisational set up which unnecessarily delay the completion of the projects escalating the cost of each project and depleting the resources of the State.

Our suggestion in improvement of irrigation facility is as follows :—

(1) On-going projects should be completed within a specified time limit, let us say within the first two years of the 6th Plan. It involves huge amount of cost when a number of projects are taken up simultaneously and none is completed on schedule. It seems pertinent to fix a period limit for major and medium projects to avoid increased outlay and complete all on-going projects before the end of Fifth Plan or the 1st year of the 6th Plan.

(2) There is a great deal of regional imbalance between districts in regard to irrigation. For example, by the end of the 4th Plan, the percentage of cumulative potential under major and medium irrigation projects varied from 56·00 in the district of Cuttack to nil in Keonjhar, 0·99 in Koraput, 1·50 in Mayurbhanj and 1·60 in Dhenkanal. Even after the completion of the on-going projects and new projects taken up during the 5th Plan, the regional disparity continues to be an important source of irrigation. Though certain districts like Dhenkanal, Koraput and Keonjhar are likely to improve their position, no substantial change is noticed in irrigation potential of Kalahandi, Sundargarh and Mayurbhanj. What is implied here is that it is not possible to reduce regional imbalance in irrigation by means of major and medium irrigation projects, both from the point of view of inadequate resources and deficiency in organisational structure which inevitably increases the cost of each project. It is our information that large and medium projects are more costly per unit of irrigated acre or hectare than deep tube-wells or dug wells. It is probably time to make a study of cost-benefit of each irrigation project in order to find out whether the statement is correct.

We do not mean to say that large and medium projects should be completely given up. The projects which have already been sanctioned have to be completed. Any departure from this may create other difficulties formidable to overcome. Similarly, in a democratic set up some projects of gigantic nature have to be conceived and taken up in order to create a sustaining impression in the minds of the people who are often swayed more by gigantism rather than by modest activities. But by and large, our programme of activities should be confined to lift irrigation dug wells and small irrigation projects. We guess, the objective of the 5th Plan to bring under irrigation 50 per cent of irrigable area in each district within a decade can be achieved more successfully by small ones rather than by large and medium ones. Only where there is assistance from World Bank, large projects can be taken up to change the landscape of a particular region.

(3) It was redeeming to note that sufficient emphasis was given to minor irrigation (flow) in the Fifth Plan. There was a total outlay of about Rs. 20 crores. Further, the proposal to focus attention on new schemes in drought-prone areas, backward areas and other areas where no irrigation facility is available was in the proper direction. But the most important difficulty noticed in case of these that they are never comleted on time as a result of which a number of such projects spillover to the next Plan involving huge extra cost. Same is the picture with regard to lift irrigation and even with dug-wells. Even though we propose that large number of such new projects

should be taken up in the 6th Plan and all the spilledover projects should be completed, we insist upon, the following three conditions for the successful executions of these schemes. One, there should be a fixed time-limit for each project which should be strictly adhered to and anybody found responsible in delaying the process must be severely dealt with. Second, once the project and the financial estimates are approved, on no accout, additional sanction should be made to get the scheme going. Probably this will be a limiting factor on the part of the irrigation department to postpone the completion of the work. Once they know that the amount sanctioned for the scheme is unalterable, there will be little scope for manipulation. Besides, there should be a shelf of complete investigated project on hand which can be taken up in short notice and completed within a short period of one or two years.

(4) There is considerable scope to reduce water requirement of different crops for intensive use of every drop of water. For example, it was previously estimated that water requirement of rice is 140—150 cm. But recent data obtained from experiments show that water requirement of rice varies from 80 cm. for short-duration varieties to 100 cm. for late duration varieties. Farmerss are therefore to be given adequate training for proper management of irrigated water in order to raise more crops within the available supply. There is a need now to change the pattern of extension education.

Further, crops which require less water but at the same time, provide more remuneration should be taken up in large-scale. Water reqirement of some of the important crops are given below:—

| | | |
|---|---|---|
| (1) Wheat | .. | 33 cm. |
| (2) Greengram | .. | 15 cm. |
| (3) Blackgram | .. | 15 cm. |
| (4) Arher | .. | 20 cm. |
| (5) Peas | .. | 20 cm. |
| (6) Til | .. | 23 cm. |
| (7) Mustard | .. | 30 cm. |
| (8) Linseed | .. | 30 cm. |
| (9) Groundnut | .. | 38 cm. |
| (10) Onion | .. | 30 cm. |

In view of acute scarcity of oil-seeds and pulses it seems essential to increase the production of the above crops to economise the use of water and increase the fat and protein contents of food grains. In fact, dry farming is now an essential aspect of agricultural development in view of shortage of irrigation facility.

Irrigation is the most important factor in agricultural development and highest priority should be given not only to increase the irrigation facility but also to make use of the available supply of water in an efficient manner.

**Fertilizers and Manures**

The success of green revolution depends greatly on the availability of fertilizers, pesticides and insecticides. They must be available in the right quantities, at the right times and in the right places. Even though Orissa lags behind other States in consumption of these inputs there is noticeable increase in recent years. The per hectare consumption of fertilizers increased from 1·4 Kgs. in 1964-65 to 5·1 Kgs. in 1971-72 and now it is about 8·6 Kgs. However, there is need to change the strategy of fertilizers consuption. There is not only acute shortage of chemical fertilizers, the prices are also inordinately high in so much so that no cultivator of foodgrains can afford to use them. This is a great set back to the promotion of high yielding programme. If this trend continues, we may have to shift to desi varities as was in vogue in Orissa under traditional agriculture. Without sufficient dose of chemical fertilizers, dwarf variety does not compare favourably with desi variety.

The agricultural plan in Orissa is heavily weighed in favour of chemical fertilizers. There is need to reorient the plant and emphasis the production and application of organic manuers. Proposals given in the plan seems to be inadequate to meet the requirements of additional production. Our proposal for changing the strategy is given below :

(1) We cannot do away with inorganics since organics cannot replace inorganics. What is required is to find out ways for economic use of fertilizers and search for alternatives which are available in the State. This implies considerable increase in the use of renewable resources and on the wise husbanding of non-renewable resources. Some of the recent research studies show that a combination or organics and inorganics is likely to produce better result than application of only inorganics. Of the total requirements of fertilizers, if 50 per cent can be given as organics and the rest as inorganics, we can get best results. Organics have an advantage of long-term residual effect which inorganics do not possess.

(2) There is a case for increasing phosphatic fertilizer and calcium carbonate by grinding basic slag, a by-product of the steel industry, which is currently wasted. We do not have the figures of annual production of basic slag in Rourkela. But this slag contains 40·30 per cent of Ca° and 2·25 per cent of $P_2O_5$. Paper sludge available in Choudwar, Rayagada and Brajarajnagar can also provide Ca° at the rate of 33·9 per cent. However, rice does not respond to liming. But crops like potato, groundnut and maize can be applied with basic slag and sludge for liming.

(3) Organic manures will prove befter in dry farming than inorganics as moisture is the most important single limiting factor in such crops. So dry farming should be emphasised both for economising available water and saving chemical fertilizers.

(4) There is also fertilizer loss due to leaching. Recent researches have shown lipid associates of the seeds of Neem and Karanja when mixed with fertilizers can help to slow down the rate of nitrification of ammonical fertilizers and thus reduce the losses of nitrogen due to leaching and denitrification. If these local products are properly used, we can save quite a lot of chemical fertilizers.

(5) And finally, greater emphasis has to be given for making more of urban and rural composting than what are provided in the Plan. In view of shortage of non-renewable resources, we have to release energy through recycling end effective use of all wastes and by-products. At present, much of the urban wastes, sewage

water, cattle and human urine and human excreta are not recycled in a manner that will promote productivity. A definite programme needs to be prepared and implemented. The municipalities or N. A. Cs. can take up urban composting as a priority measure. Collection of garbage and excreta in the urban areas by the municipalities and composting them will not only improve the supply of organic manures, but will also make these areas much more clean than what they are.

In rural areas, composting can be taken on the basis of village plan. No individual can succeed in making sufficient amount of compost. We also do not see the availability of sufficient cowdung as a manure due to non-availability of fuel at the cheap rate. The only hope is green manuring and water hyacinth composting which can be taken up at a village level either by Gram Sahba or by the V. L. W. by involving all the people of the village, particularly young folk who can be persuaded to render service for a common cause. Production of more compost is possible by common effort than by individual effort. In such cases, it would be more desirable to have village plans with the help of Panchayati agencies for making villages cleaner and at the same time producing more of organic manures for increasing production. In addition, it will be more desireable to raise more leguminous shrubs on bunds of irrigated fields for increasing the supply of green leaf manure.

**Small Farmer**

The last aspect we want to discuss is how to evolve an appropriate technology for small farmer and of the landless labour. In case of Orissa the number of small farmers is greater than the All-India average as can be seen from the following table.

OPERATIONAL HOLDINGS

| Size group (acres) | Orissa | | India | |
|---|---|---|---|---|
| | Cultivating household | Area cultivated | Cultivating household | Area cultivated |
| (1) | (2) | (3) | (4) | (5) |
| Less than 1 .. | 8·2 | 0·8 | 11·1 | 0·7 |
| 1—2·5 .. | 30·8 | 10·1 | 23·6 | 5·3 |
| 2·5—5 .. | 27·8 | 19·5 | 22·9 | 11·1 |
| 5—10 .. | 21·4 | 27·4 | 21·1 | 19·0 |
| 10—15 .. | 6·4 | 14·4 | 8·8 | 13·7 |
| Above 15 .. | 5·4 | 28·1 | 12·5 | 50·2 |
| Total .. | 100·0 | 100·0 | 100·0 | 100·0 |

Source:—Agricultural Prices Commission, Report on Price Policy for Kharif cereals (Procurement prices) for the 1967-68 season. September 1967, P. 30.

Most of the studies that have taken place in India and Orissa has shown that the big cuitivators by virture of their farm holdings can take to new technology in the pursuit of profit. In their cases, agriculture has become a money-making activity. But the benefits of green revolution have been distributed differently with different categories of farmers putting the small ones at a disadvantage. It will not be an exaggeration to say that the new strategy neglects the rural poor, small farmers and agricultural labourers. Though the new technology is size neutral, it is not resource neutral. As such the big and middle farmers derive considerable benefit from the new technology. We have therefore to evolve a new strategy for the small farmers, not only for their support, but also to increase agricultural production in the State by bringing them into the mainstream of the new technology of production.

(1) These small and marginal farmers who are now offering little surplus require more support in form of credit, extension education, marketing, etc. landless or virtually landless workers are largely dependent on the wages of unskilled labour and generally steeped in poverty. For providing a viable occupation to these people, it seems necessary to have intensive agriculture which would have to be integrated with more diversified pattern of production. In such a scheme, animal husbandry, agro-industries, rural electrification, communications and education have to fit in as parts of an integrated programme. There is no scope for shifting people from rural areas to urban centres in near future. We have to widen the range of economic activities and improve the general infrastructure facilities available to rural areas in terms specially of transport, regulated markets, credit facilities, etc. For each village there should be a plan with a view to changing the rural scene involving the following activities:—

(a) introduction cf dairy farming with improved breeds on a large scalei,

(b) growing new crops including pastures and plantations. We cannot now Ignore live-stock products. We need them much more and so also fruit, fuelwood and timber,

(c) extension of technical improvements to hitherto neglected cultivators and areas,

(d) extension of gardening and poultry farming in suburban belts,

(e) puttinq up some agro-based industries ou the basis of available resources,

(f) evolving new implements which are easy to handle and repair. A bicycle shop can be able to repair them in order to avoid waste of capital,

(g) developing suitable marketing, credit and infrastructure facilities to sustain these activities.

For all this village plan is more helpful than either a macro plan or individual cultivator programme.

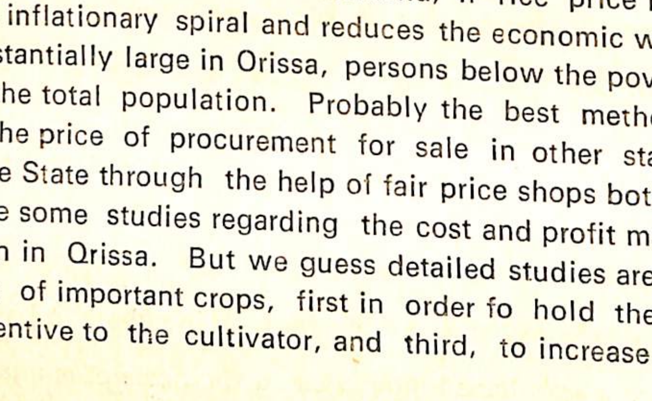
If we have to initiate changes in the rural areas, the village should be the basis for initiating change. We have a social structure which has a tremendous appeal to the people. The existing structure should be accepted and changes introduced to make them viable and living units.

(2) The second task in order to help the small and marginal farmers along with agricultural labour is to complete the process of land reform which has been hanging as a

dead burden since independece. Farm Management studies in India have shown that in terms of productivity per acre, a small farmer has greater advantage than a larger one. Further, the owner cultivator gets more yield per acre than a tenant. But the small or marginal farmer derives less income per unit of labour since he does not have the necessary facilities to modernise agriculture. By sheer human effort, he gets more from a unit of land than a bigger one. There is now an urgent necessity to accelerate the process of change in villages by completing the agrarian reform which has been thought of even before independence but never taken seriously due to political resistance. A moderan village with modern social background can help in modernising agriculture. Both for economic and social changes, land reform has to be completed within a definite period. Further, consolidation of holdings which has been included as a part of land reform activity must be given priority in order to increase the productivity of land. In the Fifth Plan, sufficient emphasis was not given to this aspect of development. It was proposed to bring only about 25 per cent of the cultivated area under consolidation of holding by the end of the 5th Plan. This is an inadequate measure to change the organisational set up in the village economy. The Sixth Plan should take this on a priority basis.

(3) Finally we want to touch upon incentive prices. It may be examined whether a dual price in foodgrains can be administratively feasible. Orissa does not have anything except rice to export to other States. But when Orissa is purchasing at a higher price all most all the commodities needed by the people, and has nothing to sell except rice, there is an urgent necessity to improve the terms of trade by increasing the prices of this only item of export. But on the otherhand, if rice price is pushed up in the market, it adds to the inflationary spiral and reduces the economic well-being of the poor whose number is substantially large in Orissa, persons below the poverty line constituting about 70 per cent of the total population. Probably the best method of working a dual price is to increase the price of procurement for sale in other states and sell rice at a reasonable price in the State through the help of fair price shops both in urban and rural areas. We have made some studies regarding the cost and profit margins of some of the important crops grown in Orissa. But we guess detailed studies are necessary to exactly determine the prices of important crops, first in order fo hold the price line, socond to provide sufficient incentive to the cultivator, and third, to increase the state income of Orissa.

**Professor in Economics, Utkal University,**
**Vani Vihar, Bhubaneswar.**



# A PEEP INTO RURAL ORISSA TO-DAY

Shri BINOD JHA, I. A. S.

Twenty-two million people of Orissa are living in 52,000 villages spread over hills and plains. Nature has gifted this ancient land with enermous resources hidden beneath rhe eye catching scenic beauties of hills and jungles, in the north, west and south of Orissa and vast Deltaic plains of the coastal region. While the north, south and south-west of the State are girdled up with lofty mountain ranges, hiding in their womb unlimited mineral wealth, the fertile basins formed by rivers Indrabati. Bansadhara, Nagavali and Rusikulya in the south and rivers Mahanadi, Brahmani and Baitarani in the coastal plains hold the promise of converting this State into a granary of eastern India. These colourful geographical combinations have resulted in different climatic conditions ranging from dry and salty in rhe north to cool and pleasant in the deep soufh of the State. Extensive forested areas not only bring rains but also provide potential for enermous wealth. The entire eastern boundary of this Sfate is washed out by the magestic Bay of Bengal reminding the World of the maritime glory of Kalinga and holding out unlimited prospect for exploitation of marine wealth.

Cardled in these sylvan surroundings, 52,000 villages of Orissa have been exposed to the fascinating drama of planned development through a series of Five-Year Plan. An old Kandha tribal of Koraput once said in a reminiscent mood that "in the first alf of my life, I had only paid taxes without getting anything in "return * * * .Now I find some change ; schools have come up in villages and some children are now reading. There is a Panchayat in my village and a hospital 5 Kms. away. There was no road in my childhood but, now your jeep has come fo this village." This guarded optimisim epitomises the response of the villagers to rural development programmes.

Due to greater emphasis on heavy industries during the last three decades, there has been industrial development. Rourkela Steel Plant in Sundergarh district, MIG factory in Koraput and Paradeep Port in Cuttack are the three most significant results of this phase. While strengthening the industrial foundation of the State, these enterprises are yet to bring about the desired economic transformation in the rural areas. Over the years, they have tended to become isolated pockets of prosperity. The impact of mighty multipurpose river valley projects at Hirakud and Balimela has, however, been clearly beneficial to the land holding rural population. Hirakud has controlled flood in Mahanadi system and has provided irrigation to enable double cropping in its own command as well as in the Deltaic region. In order to derive optimum benefits from the irrigation potential created by these projects, Command Area Development authorities have been constituted with the specified task of bringing about On-farm development, improved water management through construction of field channels, and propagation of modern package of farming. Water resources of Orissa have to be harnessed and exploited fully in order to bring prosperity in rural areas. The recent emphasis on early completion of Rengali Project on river Brahmani would not only control the devastating floods brought by this river every year but, would augment the controlled irrigation potential of the State enormously. Similarly with completion of Bhimkund Project, the revages of Baitarani would be controlled and flood waters would be converted into beneficial use for irrigation purpose. Firm steps have been faken to harness the untapped water resources not only at Rengali and Bhimkund but also on Kolab and Indravati rivers. With the completion of these multipurpose projects. much larger extent of agricultural land would get irrigation and agro-based rural economy would get much needed boost.

While sincere efforts are on to harness water resources, measures to streamline tenancy through land reforms and consolidation of holdings are also being vigorously implemented. Agriculture will continue to be the main-stay for rural Orissa. As such this sector is not only to provide food to the teeming millions hut also to produce adequate raw materials for agro-besed industries. In this context, the integrated approach signified by the package of land reforms, consolidation of holdings, water management and on-farm development is vital for improving the economy ot the rural areas.

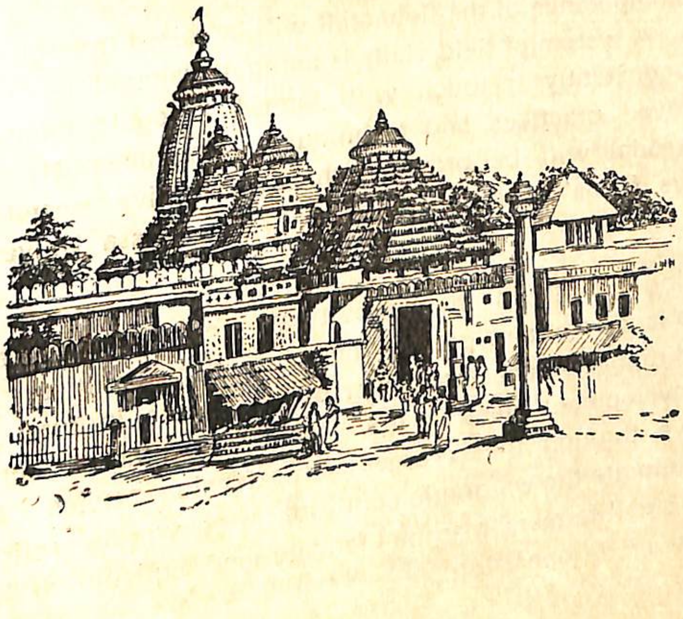
Planning in Orissa would not be adequate without catering to the needs of the vast tribal areas. Conscious of the importance of this problem, Government have grounded a number of integrated tribal development projects and have launched massive programme for exploitation of ground water through dug-wells, engergised lift irrigation pumps and filter-point tube-wells. A dynamic scheme for boosting medium and minor irrigation potential is also being implemented with firm determination. Gradually the rural scene is changing under the impact of multifarious development programmes.

The rural eccnomy of hilly regions of the State would get a significant boost with greater exploitation of the vast mineral resources. Exploitation of these resources has provided sizeable off-farm employment to the rural population. The recent emphasis on converting these minerals into intermediate and finished products inside the State itself, would further improve the economy of the rural Orissa. Heavy and medium industries have to be suitably dovetailed to agro-based rural and cottage industries. The rural scene would undergo an economic transformation with implementation of the recently announced policy, laying greater emphasis on agricultural sector and on agro-based rural industries. In the tribal areas, small scale industries based on timber, forest products and oil-seeds holds out enermous promise. Koraput district alone has about 20,000 acres, of Cashew plantation which can supply raw materials to a net-work of Cashew processing units. The hilly areas provide unlimited scope for extensive plantation which would ensure uninterrupted supply of raw materials. In the agriculture heart-land of in the plains where communication net-work is comparatively better, large number of agro-based consumer industries and processing units can be set up to provide off-farm employment to the rural unemployed. There has been a significant expansion in the rural banking net-work. Rural electrfication has also made significant progress thereby rendering availability of power easy. The resurgent youth power has to be harnessed for a meaningful rural uplift. Revival of Panchayat industries, setting up processing units for agricultural products and agro-based industries would narrow down the gap between the urban affluence and rural poverty. The new policy giving adequate weightage to the agriculture sector is bound to benefit the rural population. Conscious of the fact that without well developed and economically sound agriculture hinter land, heavy industrialisation is at times counter-productive, renewed emphasis has been put on rural development. Fervent call to convert every house-hold into a cottage industry is an indication of this firm determination.

Nature has not always been kind to rural Orissa which is often subjected to ravages of flood, drought and cyclone causing untold miseries to the people and extensive loss of properties. With the harnessing of big rivers, flood and drouht would soon be a thing of the past. A firm technological base is already available and with co-ordinated efforts, the challenging objectives of rural development would be speedily achieved.

With the awakening of a new conciousness among the rural mass, there has already been a greater sense of personal involvement in the drama of development. With proper harnessing of this resurgent man power for the development of cottage industries. handicraft, minerals and marine products, the mission for re-construction would become much easier. A break-through has already been achieved and with determined involvement of the people which is now visible everywhere, this ancient, picturesque Utkal Stage is poised for taking much bigger and more significant economic strides.

Collector, Cuttack



# AGRICULTURE IN ORISSA

Agriculture is the most important industry of Orissa. The value of crops produced is about 62 per cent of the State's income at current prices.

The economy of the State is therefore, dominated by Agricultural income. This economic position is not also likely to change in the foreseeable future inspite of the development in other sectors such as mining, forestry, Industry, commerce, transport, etc. Following wider adoption of improved technology and higher investments, the pace of development in agriculture is gaining momentum and the quantum of out put per unit of input is also increasing steadily.

For a rapid spread of low cost practices and technology in the farmers' fields it is necessary to develop an effective extension service supported by adequate field oriented research. Government have, therefore, decided to reorganise the existing Agril. extension set up in the State on the lines of the recommendations made by the World Bank with the aim of transmission of recent developments in agriculture tc the cultivators in the field so they may increase their production.

The technical competence of the field staff will be raised through frequent in-service and field trainings. A system of field visits is being developed by which the Extension Workers will be constantly in touch with farmers at regular intervals carrying to them messages on improved practices and techniques. Simultaneously research support to the extension personal will be provided through adoptive research in the district farms and trials in farmers' fields' in co-operation with the Orissa University of Agriculture & Technology.

For accelerating growth in the agricultural sector it is necessary to improve the productivity of the lands and also provide more irrigation facilities. This is the key of higher income and higher purchasing power of the people in rural areas of the State. The agricultural development plans for the year 1977-78 are designed to achieve this important objective through the re-organised extension service. Special measures are being taken to ameliorate the economic condition of the weaker section of the community, mainly the tribals, small farmers, marginal farmers and agricultural labourers, for whom special programmes are in operation.

## Agriculture Land and its uses

Agricultural land constitues 48·6 per cent of the total agricultural and non-agricultural land in Orissa. Out of this the net sown area accounts for 38·9 per cent. Current fallows and culturable wasteland taken together bill account for 9·7 per cent. The major crops grown are rice, pulses, oilseeds, vegetables and sugarcane.

A major part of the agriculture land in Orissa is under the rice crop. Ii is the most important crop occupying 60%of the cropped area. Over 95% is grown in Kharif seson June—December when monsoon is avaialble.

Crop area and percentage of area in each crop in Orissa.

TABLE

Crop area and percentage of area under each crop in Orissa 1975-76

| Crop | Area in hectares | Percentage to the gross crop area |
|---|---|---|
| 1. Rice .. | 4684100 | 60·6 |
| 2. Other cereals (Wheat, Maize, Ragi, Jowar, Bajra and othet small millets). | 666172 | 8·6 |
| 3. Pulses (gram, Arhar, Mung, Biri, Kulthi, Cowpea). | 1133343 | 14·7 |
| 4. Oilseeds (Groundnut, Till, Castor, Mustard, Linseed, Niger, Saflower). | 496157 | 6·4 |
| 5. Vegetables including Potato, Sweet Potato & Onions. | 397222 | 5·1 |
| 6. Fruits (Mango, Banana, Citrus, Papaya, Cashewnut, Coconut & other fruits. | 118921 | 1·5 |
| 7. Fibres. (Jute, Cotton, Measta & Sunnhemp). .. | 83795 | 1·1 |
| 8. Sugarcane .. | 45355 | 0·6 |
| 9, Condiments and spices .. | 90774 | 1·2 |
| 10. Tobacco | 16744 | 0·2 |
| Total — | 7732583 | 100·00 |

Paddy is the most important crop occupying 60%of all cropped area. Over 95% in the Kharif season, June to December. In the coastal districts, paddy is virtually the only crop grown in Kharif. In upland areas the cropping pattern is slightly more different. Small grains, pulses and oilseeds being grown in addition to paddy. About 20% of the area is double cropped and most of the 2nd crop coming after Kharif paddy on residual moisture.

The introduction of H. Y. V. P. paddy since 1966-67 in the irrigated area of Sambalpur and in the Cuttack district has brought home in the green revolution in the State. In the year 1971-72 an area of 196000 Hects. were brought under H. Y. V. P.

programme where as in the year 1977-78, an area of 10,00,000 hectares are brought under different varieties of H. Y. V. P. paddy and by the end of 5th Plan 16,000,000 Hects. will beb rought under he programme.

H. Y. V. P. paddy yield per Hectares, s 3 times more than the usual improved and local varieties of paddy grown by the farmers of the State.

In the field of cereal production, the State has achieved a significant result. In the year 1950-51 cereal production of the State was 40·23 lakh tonnes per annum and by the end of 4th Plan, it has gone up to 52·74 lakh tonnes by the end of 4th Plan and proposed ot achieve a significant targe t of 70 lakhs tonnes by the end of 5th Plan.

**Wheat**

In the year 1971-72 the total coverage under wheat crop was 13,000 hectares. By the end of 1977-78, an area of 120,000 hectares is brought under wheat cultivation, i. e. by end of the 5th plan, the total coverage under wheht crop will come up more than 15 times of the base production year 1971-72.

**Pulses**

Pulses as a group of crops, are next in importance to rice in Orissa. The proportion of area under rice to that under pulses is 6—1. But as the yield of pulses is comparatively low, the proportion of production respectively is 11 : 1. At present respective rate of yield of rice and pulses, Orissa needs to grow one hectare of pulses for every three hectares of rice in order to meet the proportionate requirement of pulses for its population. Planning is done to replace the entire area of low yielding millets by pulses of improved varieties and to increase the yield rate of pulses by adoption of improved cultivation. Mung, Biri and Kulthi together cover 84 per cent of the total area under pulses. In Rabi season (Oct.-March) the area under pulses is 85·5 per cent of the total pulses. But the average yield in Kharif (June-Oct.) season is about 18 per cent more than in Rabi season. Availability of pulses per adult per day is 57 grms. which is 2/3rd of what is necessary for a balanced diet. For self sufficiency of the protein food, all efforts are being made to boost up pulses production in he State.

**Oilseeds**

Oilseeds as group, include Til, Groundnut, Mustard, Niger, Linseed, Saflower and Caster. Caster is used mainly as Lubricant. All the other oilseeds are used within the State mainly for cooking purpose. A part of the groundnut production is exported outside Orissa.

Til, Groundnut, Niger and caster are grown both in Kharif and Rabi season. Mustard, Linseed and Saflower are rabi season crops. The distribution of area between kharif and rabi season for all the oilseeds taken together is 38 and 62 per cent respectively.

In Orissa we produce about 31 gms. of oilseed (10 gms. oil) per head of adult population which is less than one fourth of the requirement for a balanced diet. In the year 1950-51 total oilseed crops is 0·61 lakh tonnes and by the end of 4th plan has gone to 2·46 lakh tonnes per annum i. e. 5 times of the base production year 1950-51.

## Fibres

### Jote and Masta

Jute and Mesta are the important fibre crops and major quantum of the fibre are exported outside the State, due to non-availability of Jute mill and processing centre in the State. The important Jute growing district of Orissa is Cuttack. Recently the State has taken an initiative for installation of a Jute mill in Cuttack district, which is the major district of Jute Production in the State. Production of fibre cropl—Jute and Mesta in the year 1950-51 is 2·46 lakhs balls and has gone up to 5·76 lakh bales by the end of 4th plan, i. e. about more than two times.

### Sugar-cane

Sugar-cane is the most important commercial crop of the State. But in the base year 1950-51 the production of Sugar-cane per annum was 0·25 lakh tonnes and it has gone upto 2·41 lakh tonnes per annum by the end of 4th plan.

### Vegetable

The most important vegetables grown in Orissa are Potato, Onion, Brinjal., Cucurbits, Bhendi (Okra), Tomato, Cabbage, Cauliflower, Peas, Beans, Radish and Leafy vegetables, Plantains, Papaya, varieties of Yama and corms are also used as vegetables.. Certain vegetables such as Brinjal and Cucurbits are grown in all seasons of the year, whereas okra are grown either in one season or the other. The area under vegetables is equally shared in kharif and rabi seasons. A little more than 3·90 lakh hectares were put under vegetable crops per annum.

### Condiments and Spices

Chillies, Turmeric, Coriander and Garlic are the important crops belonging to the group of condiments and spices. Highly fertile lands are set apart for cultivation of these crops. Total area covered under these crops is more than about 91,000 hectares, out of which, about 56 per cent is occupied by chillies alone. About 15,000 tonnes of dry chillie are produced per annum with an average yeild of 6·57 quintals per hectare. Ginger (dry) and Turmeric yield on an average is 25 quintals per hectare.

### Tobacco

An area of 11,079 hectares are covered under Tobacco per annum. The entire Tobacco grown i of Hooka smooking) type. Annualy about 10,000 tonnes of Tobacco are harvested.

### Horticultural and Plantation Crops

Mango and Banana are important horticultural crops of Orissa. Citrus, Papays and Guava are grown in a limited scale. Coconut is the most important plantation crop. Cashewnut cultivation has been taken up recently with Governmental efforts. Horticultural plantation crops together cover about 1·18 lakh hectares of area.

During the year 197 -77 an area of about 4,000 hectares have been planted with fruit plants like Mango, Jack fruit, Guava, Ber and other fruit trees.

**Mango**

Mango is the principal fruit crop in the State covering an area of about 60,000 hectares although plantations of grafted varieties like Baiganapalai, Latsundari, Totapuri, Neelum, Langra, Bombay green, etc., are rather few and far between.

**Pineapple**

An ambitious programme for pineapple cultivation in the tribal areas has been formulated and multiplication of planting materials has been undertaken.

**Coconut**

The coconut extension programme has really made an impact in the State. Coconut cultivation covers 11,582 hectares in the State producing 4,377,200 nuts annually.

**Banana**

Banana is an important fruit crop of the State with an area of over 14,000 hectares under the crop.

**Soil Conservation**

Utilisation of waste land in Orissa by plantation of different types of plants has been progressed to a great extent.

| | | | |
|---|---|---|---|
| Cashew | .. | 22,881·2 | Hectares |
| Tree planting | .. | 10,752·8 | Do. |
| Pasture | .. | 1,227·6 | Do. |
| Sisal | .. | 1,920·0 | Do. |
| Coffee | .. | 267·2 | Do. |
| Lemongrass | .. | 122·8 | Do· |
| Pineapple | .. | 60·0 | Do. |

# Progress of Animal Husbandry Activities in Orissa

To improve the general financial condition of the under-privileged masses of the State, who constitute a major percentage of the State's population, various animal husbandry programmes have been takan up in the State of Orissa.

**Cattle Development**

For development of cattle in Orissa, the main thrust has been :—

(a) Intensification of Cross Breeding Programme using exotic inheritance through Artificial Insemination as well as natural services,

(b) Augmentation of food and fodder resources, and

(c) Milk collection, processing and marketing.

(i) The number of exotic bulls as stood has been increased to 131.

(ii) Additional semen collection centres have been opened so as to make each district self-sufficient in this regard. There are now 26 centres including one Buffalo Semen Collection Centre.

(iii) 469 Artificial Insemination Centres are now functioning in the State.

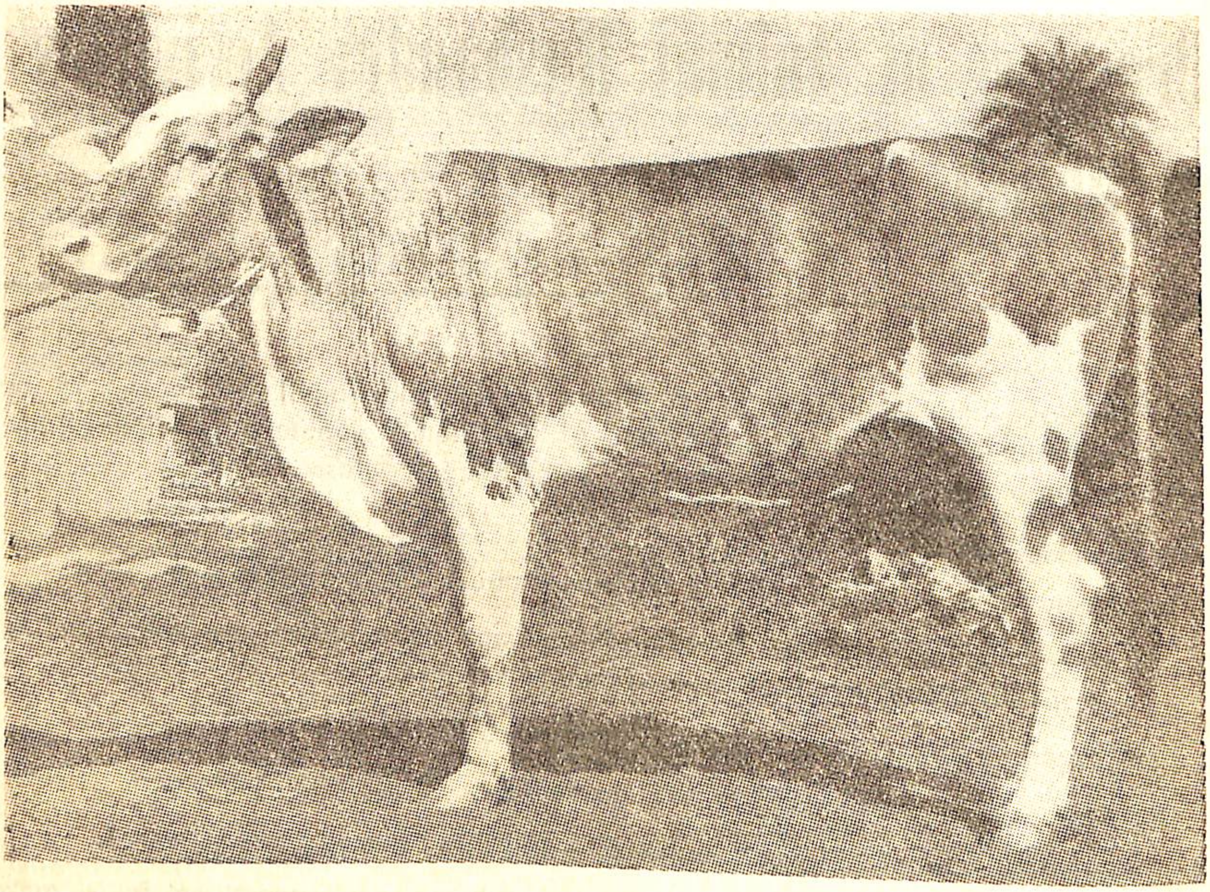
(iv) Insemination, particularly from exotic sources, is now highly popular amongst farmers of the State of Orissa. There are three Intensive Cattle Development Projects functioning in the State. The I. C. D. Project, Cuttack and Berhampur are now full-fledged covering 1·4 and 0·5 lakhs of breedable cows respectively. The I. C. D. Project, Sambalpur is recently put to full operation covering 0·5 lakhs of breedable cows. One small I. C. D. Projcct at Jeypore is going to be opened during this year. There are 23 Key Village Blocks in the State with 242 units.

(v) In order to develop the rural areas, cattle breeding with cross-bred bulls produced from Government farms or from urban areas selected from superior dams are proposed to be undertaken. During the current year such a programme is being taken up around Talcher in continuous areas of 25 villages.

(vi) A Frozen Semen Bank is going to be established at Cuttack with DANISH assistance. 10 Jersey bulls have already been received.

(vii) The Utkal Gomangal Samiti has already distributed 128 cross-bred bulls, 176 Red Sindhi Bulls and 2,407 Hariana bulls.

### Cattle Breeding Farms



Cross-bred Jersey Cow

### Exotic Cattle Breeding Farm, Chiplima

(a) A consignment of 50 Jersey animals have been received from Denmark under a Centrally Sponsored Scheme for this farm.

(b) This Department is having 10 cattle breeding farms for producing large number of Cross-bred bulls for utilisation in upgrading local cattle. This also resulted in production of high yielding cross-bred cows.

(c) There is an exotic cattle farm at Sundargarh where only cross-bred cows with 50 per cent exotic blood level is maintained.

(d) All the available areas in the farm has been reclaimed for cultivation of fodder throughout the year.

(e) The Feed Mixing Centres of the State supply concentrated cattle feeds to these farms.

## Fodder Development

1. To make the Animal Husbandry Department of Orissa self-sufficient in fodder seeds and planting materials, three seed development farms have been developed at Panchamahal, Chiplima and Salpada, where 50, 50 and 40 acres have been brought under fodder cultivation. Besides, two small seed multiplication farms each with 20 acres of land have been started at Boudh (Landibandh) and Bhawanipatna.

2. During the year 1976-77 a total area of 2,092·11 acres have come under fodder cultivation which includes the demonstration plots at all the departmental institutions under 16 Animal Husbandry Districts of the State.

## Minikits

Minikits programme sponsored by Government of India has also become very popular. During the kharif season of 1977-78 a total number of 400 minikits have been distributed to farmers. So far 1,400 minikits have been distributed to farmers from 1975-76 to 1977-78.

## Pasture Development

During the year 1976-77 a total area of 400 acres was brought under cultivation, out of which 95 acres were under forest land.

Cross-bred Guernsey Cow

**Horticulture plant programme**

During the year 1976-77 a total number of 20,725 trees of Koo-Babul, Acacia and Agasti were planted mostly in Government institutions as fodder trees. This year the programme has been extended to farmers' fields.

**Dairy Development**

1. So far 111 Primary Dairy Producers' Co-operative Societies have been registered and some of those societies have been federated into 5 District Milk Producers' Co-operative Unions, i. e., at Sambalpur, Dhenkanal, Cuttack, Puri and Ganjam. The Animal Husbandry Department has sanctioned share capital contribution at the rate of Rs. 1 lakh to the unions at Dhenkanal, Sambalpur and Cuttack and Rs. 50 thousand to Puri union.

The district unions of Dhenkanal and Berhampur have started collecting milk to the extent of 1,000 and 1,500 litres a day. The Sambalpur union is collecting milk of about 800 litres a day. Puri union is collecting about 500 litres of milk a day and collection of milk around Bhutimundi for supply to Paradeep is about 300 litres per day.

2. The Agro-Industries Corporation which has installed a Milk Plant at Phulnakhara is collecting and marketing 2,500 litres of milk a day at present.

3. Operation flood programme is going to be implemented in Cuttack, Puri and Dhenkanal districts, very soon.

4. Financial assistance has been provided to farmers through S. F. D. A./M. F. A. L. agencies to purchase milch cows. So far the following numbers of milch cows have been purchased through these agencies—Dhenkanal—1,628, Balangir—240, Ganjam—4,006, Cuttack—488 and Keonjhar—236.

Some of the Milk Co-operative Societies have been given financial assistance of Rs. 2,000·00 each for procurement of required testing equipments and chemicals.

**Special Live-stock Production Programme**

A Centrally sponsored scheme "Special Live-stock Production Programme" is being implemented in Cuttack, Puri, Dhenkanal, Sambalpur, Keonjhar and Koraput districts for the benefit of Small/Marginal farmers and Agricultural labourers.

1. Calf Rearing and Poultry Development in Cuttack district
2. Calf Rearing and Poultry Development in Puri district
3. Calf Rearing in Dhenkanal district
4. Poultry Development Programme in Sambalpur district
5. Piggery Development Programme in Keonjhar and Koraput districts

During the year 1976-77 a sum of Rs. 5·05 lakhs was provided towards subsidy under different programmes, which has been fully utilised.

| Name of district (1) | | Calf Rearing (2) | Poultry Development (3) | Piggery Development (4) |
|---|---|---|---|---|
| 1. Cuttack | .. | 479 | 173 | .. |
| 2. Puri | .. | 233 | 71 | .. |
| 3. Dhenkanal | .. | 280 | .. | .. |
| 4. Sambalpur | .. | .. | 170 | .. |
| 5. Keonjhar | .. | .. | .. | 312 |
| 6. Koraput | .. | .. | .. | 177 |

**Goat Development Programme**

1. Goat Development Programme has been extremely popular with farmers. The achievement in setting up of goat units under special projects such as the S. F. D. A., M. F. A. L. and I. T. D. P. has exceeded almost 300 to 400 per cent more than the target.

2. During the last two years 550 bucks have been purchased from Delhi area and distributed to the special projects for upgrading the local goats.

3. To become self-sufficient with regard to beetal bucks, the Goat farm at Chiplima has been strengthened. Another small farm with 50 does have also been established at Khajuripada in Phulbani district as a part of D. P. A. P. Programme.

**Sheep Development Programme**

1. A small programme has been undertaken in Orissa State, under which five ewes and one ram is supplied to the selected farmers with the condition that they will return the same number of animals within 18 month's time. This programme is being implemented in Sambalpur and Balangir districts.

2. The Sheep Breeding Farm at Chiplima and Deogan (Balangir) has been strengthened with corridale rams procured from Central Sheep Breeding Farm, Hissar. There are 400 ewes at these two farms and 10 corridale rams have been stationed at each farm in order that large number of cross-bred animals can be produced for use in the district programme.

**Piggery Development**

The Pig Development Programme is very popular in the tribal districts. In order to supply quality pigs noted for rapid growth and high feed conversion efficiency, the Pig Breeding Farm at Chiplima is being stocked with four exotic breeds of pigs viz. Berkshire, Landrace, Large White Yorkshire and Middle White Yorkshire.

The Pig Breeding Farm at Bhanjanagar in Ganjam district has been revived with the funds of D. P. A. P.

As pure bred pigs find it difficult to survive under village conditions, it has been decided to maintain only 50 per cent exotic blood level in the village stock.

A Bacon factory at Rourkela will be started soon under I. T. D. P. Programme.

## Poultry Development

1. Intensive Poultry Development Projects have been established at Rourkela, Bhubaneswar and Berhampur. The number of farmers served under each of these projects and the number of birds available are indicated below :—

| Name of the Project (1) | No. of farmers No. of units existing (2) | No. of birds available (3) |
|---|---|---|
| 1. Rourkela .. | 1,230 Small units<br>135 Large units | 22,610 |
| 2. Bhubaneswar .. | 150 | 25,456 |
| 3. Berhampur .. | 202 | 15,541 |

Poultry Unit

2. Three State Poultry Farms viz.—Sundargarh, Angul and Koraput and one Government of India Poultry Farm at Bhubaneswar are now functioning in the State. At the Poultry Farm, Angul, a breeding programme in collaboration with Government of India has been taken up to produce genetically superior stocks for supplying to special Projects and farms.

3. The Feed Mixing Centres at Sundargarh, Remuna, Angul, Bhanjanagar and Koraput are supplying balanced feeds to all farms and projects Including cattle, sheep, goat and pig.

4. 52 numbers of Poultry Co-operative Societies have been organised in the State. Financial assistance in sape of share capital has been provided to the extent of 1 lakh to 10 societies. A State Level Poultry Producers' Co-operative Marketing Federation has been organised and marketing of eggs is being done at Talcher through this Federation.

5. A Carcass utilisation centre in the Co-operative sector has already been organised in order to salvage fallen carcases available in Cuttack Municipality area.

6. Poultry units have been established in 27 Blocks under the A. N. P. 500 eight-weeks old chicks are supplied to school children for rearing under this programme. During the current year, 15 more effective A. N. P. Blocks have been selected to start with 600 back-yard poultry units and 500 duck units through UNICEF assistance.

**Duckery Development**

1. Seven duck multiplication units at Puri, Nimapara, Pipli, Kausalyagang, Banki, Balugaon and Bhanjanagar have started functioning with Khaki-Campbell breeds. Egg production has started at each of the units.

2. For up-grading desi ducks, 70 drakes of Khaki-Campbell breed have been distributed in selected areas and more are to be distributed when drakes will be produced from hatching eggs.

3. All formalities have been completed to import 700 ducklings from England for a proposed duck multiplication unit at Cuttack.

4. Custom hatching facilities has been provided to farmers and during the last financial year 5,474 numbers of duck eggs were hatched in this process.

**Disease Control**

1. The Orissa Biological Products Institute has been strengthened to increase its production capacity of various vaccine and to produce a new Tissue-culture vaccine against Rinderpest.

2. The typing of various strains of virus responsible for out-breaks of Foot and Mouth Disease in the State has been undertaken through the Epidemiological units established by the Department in the Veterinary College premises. Simultaneously, vaccination of cross-bred animals with F. M. D. Vaccine has been taken up and subsidy of 50% towards cost of vaccine is being borne by the Department.

3. The disease control organisation of the State has been streamlined. At the State Livestock Breeding Farm, Chiplima, the Provincial Veterinary Laboratory with the services of a Pathologist, Bactoriologist and Parasitologist is functioning for the State as a whole. At the Range level, there is a Range Investigation Laboratory with a specialised Range Investigation Officer is its head. All the Veterinary Hospitals and Dispensaries have a Field diagonostic laboratory attached to each institution.

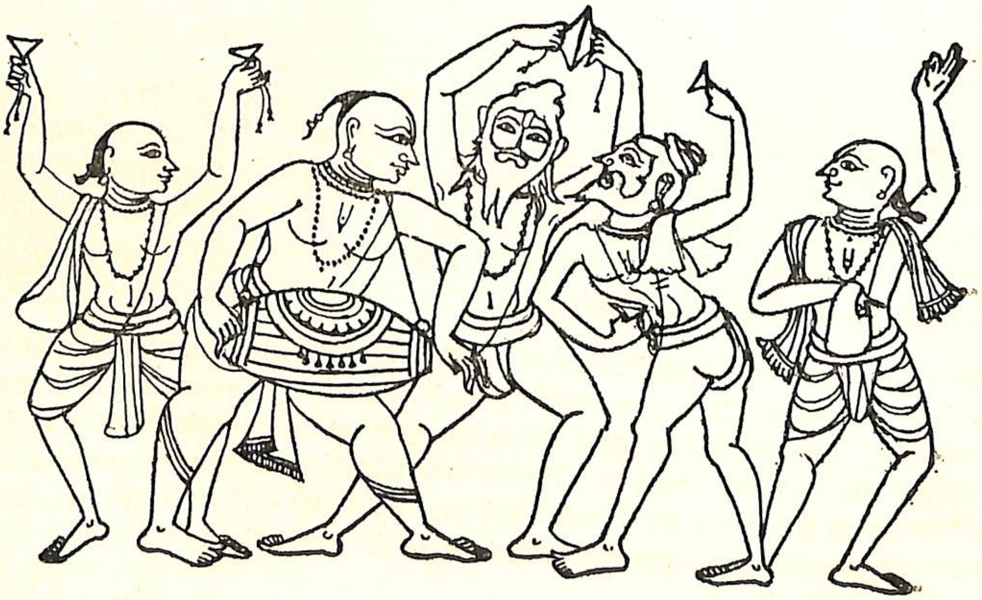
1. The State Government have sanctioned a post of Additional Veterinary Assistant Surgeon for each N. E. S. block who will be responsible for providing technical knowledge in the management of livestock.

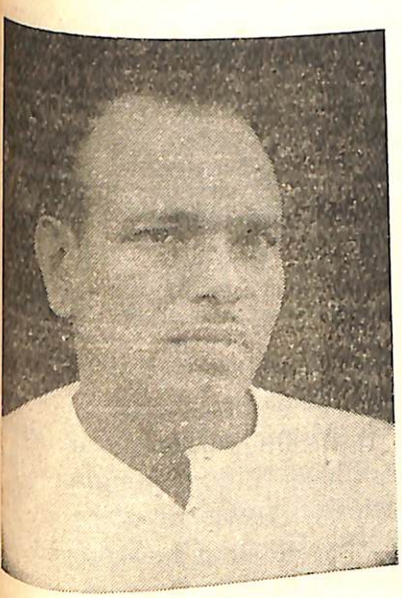
## Administrative Re-organisation

The Department has been re-organised to avoid duplication of work. Accordingly, the District Veterinary Officers are assisted by 3 subject matter specialises in Cattle Development, Poultry and Disease Control. So also is the case in Range level Deputy Directors. At the Headquarters, the Director is assisted by subject matter Deputy Directors who assist Ranges and district administration to maintain optimum technical efficiency.

## Information and Publicity

The Information Bureau of the Directorate has been strengthened. An Animal Husbandry bulletin is brought out in each month. There is daily broadcast in the All India Radio on Animal Husbandry activities. The Information Bureau also contributes articles to local dailies and a number of periodicals. A large number of hoardings will be displayed in different aspects of Animal Husbandry development soon. Cinema slides are being exhibited in number of places. Animal Husbandry programmes are being telecast in the satelite system television. A number of booklets on various Animal Husbandry subjects have been brought out. Comprehensive Animal Husbandry guide in Oriya is under publication. Animal Husbandry calendar is under preparation. Cattle Fairs and Cinema shows are being regularly organised by the Information Bureau.





# FISHERIES DEVELOPMENT IN ORISSA

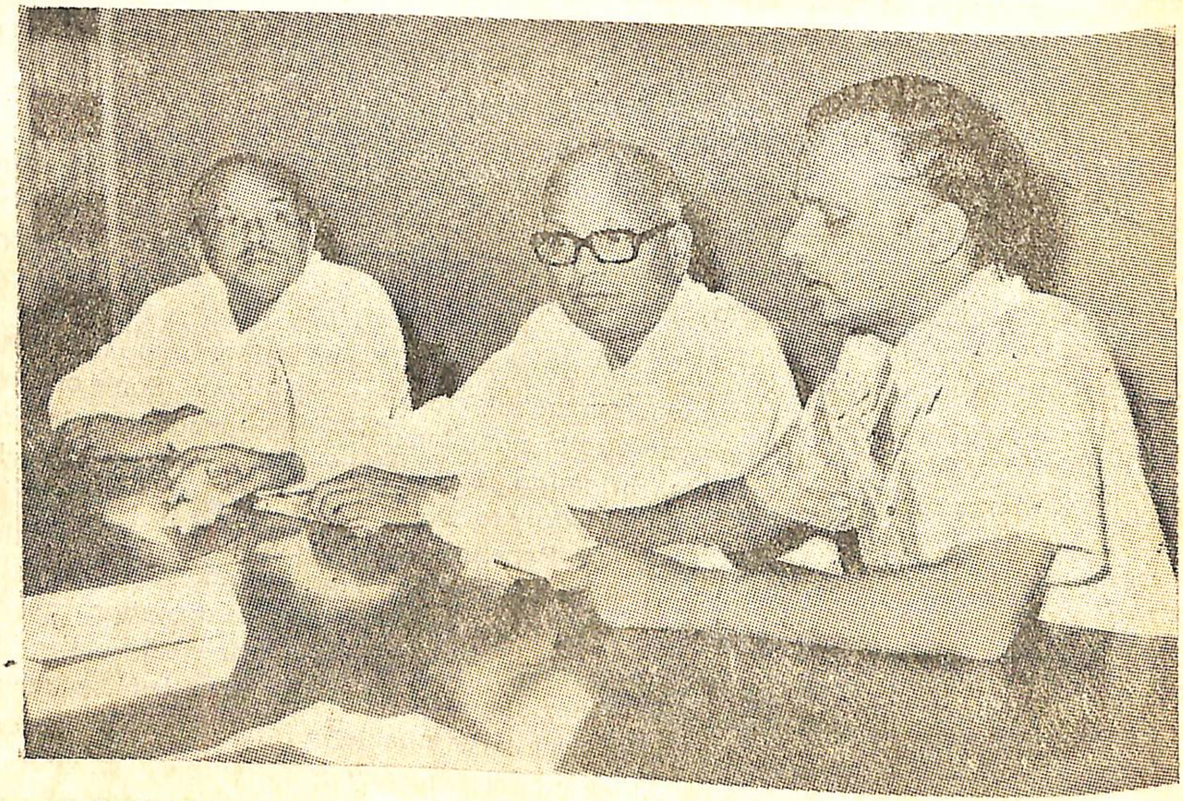
Shri NATABARA PRADHAN

Although our State has vast potentialities of fisheries development, not much attention has been paid so far to exploit this rich and potential source of wealth to the overall benefit of the people. It is needless to say the fisheries development programme must be both production and employment oriented.

The first thrust of fisheries development should be, in my opinion, on the inland side. As you all know we have vast water area suitable for pisciculture. Some of them are privately owned but most of them are public owned various Departments of Government like Revenue, Grama Panchayats, Irrigation, etc. The Departmental activities with regard to inland fisheries appear to be limited only to collection of spawn from riverine sources and supplying them to different Grama Panchayat tanks in the State. Some percentage of fish seed is no doubt obtained from induced breeding. But riverine collection on which we still mostly depend for our fish seed supply does not ensure either quality or their survival. Much of the energy and expenditure is wasted in their collection, production, transport and distribution. Bulk supplies are still controlled by private agencies from Bengal. I am told that there are a large number of Departmental Nursery tanks spread over throughout the State which do not serve any useful purpose either from the point of view of quality supply or from the point of view of meeting the required quantity of fries and fingerlings. It is not necessary to spend money on repair, maintenance and watch and ward, etc., of all these Departmental tanks. The strategy to my mind should be to close such uneconomic tanks and concentrate on development of a few hatcheries where induced breeding could be carried on a large scale through our experts trained in the field. Success of this scheme will mostly depend upon a satisfactory scheme of distribution. The private fish seed suppliers have a become successful mostly because they give delivery of fries and fingerlings at the door-step of fish farmers. But in our scheme of supply the Panchayats and private farmers are to come to the district or Subdivisional Headquarters where nursery tanks are situated and carry them to the tanks for stocking and development. This puts them to heavy expenditure and a lot of mortality also occurs in transit. That is why our only inland activity has not gathered popularity of momentum. Therefore, a scheme of scientific production through induced breeding and their proper distribution at the point of consumption should be worked out immediately and whatever subsidy is required initially, for this purpose should be found out from the Plan Budget. This would be reflected n the next year's Budget itself.

## COMPOSITE PISCICULTURE

Most of the water areas belong to public bodies like Municipalities and Grama Panchayats. The Grama Panchayats do not attempt to carry on scientific pisciculture like composite pisciculture. Government have spent vast sums of money in some of the Grama Panchayat and Revenue tanks out of drought grants. Science has proved the efficacy and economics of composite pisciculture in smaller tanks and all of you have seen its success in the pilot projects carried on by the Central Inland Fisheries Research Institute in the districts of Cuttack, Puri and Ganjam. Against an average only 100 to



District Fisheries Officers conference held at Bhubaneswar on November, 7 & 8, 1977. Photo shows—Shri Natabara Pradhan, Minister, Shri N. C. Beuria, Secretary of F. Fy. & A. H. Deptt., Shri R. M. Senapati, Director of Fisheries.

200 Kgs. per hectare of stocking area obtained from our Departmental tanks, experiment has shown an average production of 3,500 Kgs. per hectare from Puri and Aska Centres in 1975-76 from scientific composite pisciculture which gave a gross income of about Rs. 15,500 per hectare and a net income of Rs. 7,500 per hectare after meeting all expenses on inputs, labour, nets, etc. This is certainly more than what could be expected from an hectare of agricultural land. I do hope that a few demonstration-*cum*-pilot projects should be taken up in each district either by individual fish farmers or by Co-operative Societies or by Grama Panchayats.

Great tact and ingenuity may be needed to select water areas suitable for such programmes so that it does not conflict with irrigation and drinking water rights of the community. Wherever such conflict arises a compromise formula has to be evolved so that pisciculture, irrigation and drinking water rights may go side by side. Each District Fisheries Officer should be given a target for taking up such composite pisciculture. Entry in his C. C. R. and subsequent promotion should be based on successful execution of such programmes in the district.

The National Commission on Agriculture has already recommended that the management of water areas including reservoir fisheries should by vest in the Fisheries Department. Uttar Pradesh and Punjab and some other States have shown that it is possible to take up commercial pisciculture in irrigation reservoirs. In some reservoirs in Punjab and Tamilnadu Fish production has gone up to about 200 to 250 Kgs. per hectare whereas in Hirakud it is less than 1/5th Kg. per hectare. This only shows how we are neglecting one of our important economic resources. It is possible to increase fish production through scientific pisciculture in reservoirs by selective stocking method and that can be done only if it is done Departmentally or given on long-term lease to private pisciculturists.

District Fisheries Officers Conference held at Bhubaneswar on November, 7 & 8, 1977.
Photo shows—District Fisheries Officers.

## BRAKISH WATER PISCICULTURE

Another important area where our State is rich in natural resources is the existence of vast areas of brackish water and estuaries. So far these areas were considered useful from the point of view of capture fisheries. But experience and experiments have shown that brackish water pisciculture is a viable industry and can be taken up on a commercial basis. In fact under the recent concept of greater emphasis on rural development and employment, brackish water fish culture comes to occupy an important role. In Kerala and West Bengal prawn culture in rice fields has achieved wonderful results bringing in crores of rupees not only by way of foreign exchange but also by way of improving the lot of the common man in those areas. I do not understand why similar results cannot be achieved in our brackish waters and estuaries. With Chilika being the largest brackish water lake in the country, I visualise Orissa to lead the entire continent in successful production of brackish water fish. Conservative estimate shows that in one hectare about 2300 Kgs. of fish and prawns can be produced and the income is Rs. 15,000 against an expenditure of Rs. 5,000 per hectare. More enthusiastic estimates have indicated an income of Rs. 35,000 per hectare. In order to launch this programme effectively and without delay, it is useful to have a quick survey made of our existing resources. A four pronged approach is suggested—

(i) Selected stocking and rearing

(ii) Establishment of seed collection and distribution centres

(iii) Commercial production of prawn and fry under controlled conditions

(iv) Rearing of brackish water prawn and fish from seedlings to marketable size

In the initial stage it may be necessary to give long-term lease of suitable brackish wather areas to enthvsiastic private entrepreneurs who are in a position to invest substantial money on a pilot basis. Where necessary, Co-operative Societies to take up brackish water fish culture on a large scale may also be formed and for them subsidy and institutional finance should be arranged. Pilot farms both on Central Sector and State Sector should be established. A beginning sholud be made in the next year's Budget on all important fronts like survey, establishment of pilot farms, collection of fish seed, etc. Future Fishery Development of the State mostly depends upon successful implementation of brackish water pisciculture in our back waters and estuaries and in Chilka and the Department should be geared now onwards to take up this scheme on a massive scale

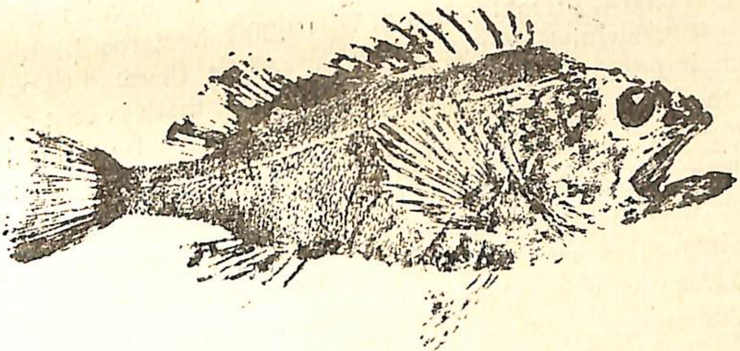
## MARINE FISHERY-II

As far as marine is concerned, the components of infrastructural development are already known. Other maritime States have far advanced in this field and our State is far behind them. We have made a small beginning with regard to attracting a few local entrepreneurs in fishing in mechanised boats. Government have recently ordered to dispose of all uneconomic departmental mechanised boats except those required for survey, training and pilot fishing purposes with a view to ultimately encourage large scale fishing by mechanised boats by young entrepreneurs throughout the coast. We have yet to develop infrastructure for deep sea fishing, fishing harbours, processing and freezing industries and marketing facilities in each of which there is vast employment potentiality. Here also the extension approach is very much needed. There is hardly any attempt at getting the maximum out of whatever resources have been built up. A jetty at Chandipur has been constructed but it has not been put to use for lack of other facilities. Dhamra harbour will be completed shortly but other infrastructure facilities like roads, electricity, etc., are yet to develop. But the most important aspect from the social point of view is improving the lot of the poor fishermen who inhabit the coast line. There may be about 50,000 such fishermen families eking out a poor subsistance livelihood from generation to generation. It is the job of the Government to improve their lot. I am told government of India have sanctioned Rs. 61·75 lakhs for developing infrastructural facilities in two fishermen villages—Kasaphala and Balitutha. More such development has to take place.

There should be resolve to help the weaker section of the people to bring them out from morass of poverty and ignorance. The benefit of science and research in the field of fishery must reach their door and it is through departmental officers that the people can feel that the Government have reached them. I hope your sincere co-operation in stepping up fisheries production and enlarging employment scope in rural areas.

[This write-up is prepared from the "Keynote address" by the Minister on the occasion of district fisheries meeting on 7-11-1977.]

Minister, Forest, Fisheries and
Animal Husbandry, Orissa.



# HORTICULTURE IN ORISSA

Horticulture covers, among others, a wide range of subjects such as fruit growing, vegetable growing, floriculture and cultivation of medicinal, beverage and spices crops maintenance of parks, recreation spots, roadside plantation, utilisation of fruits, vegetable flowers, their storage, preservation etc. Thus it is a major source for well being and happiness of mankind.

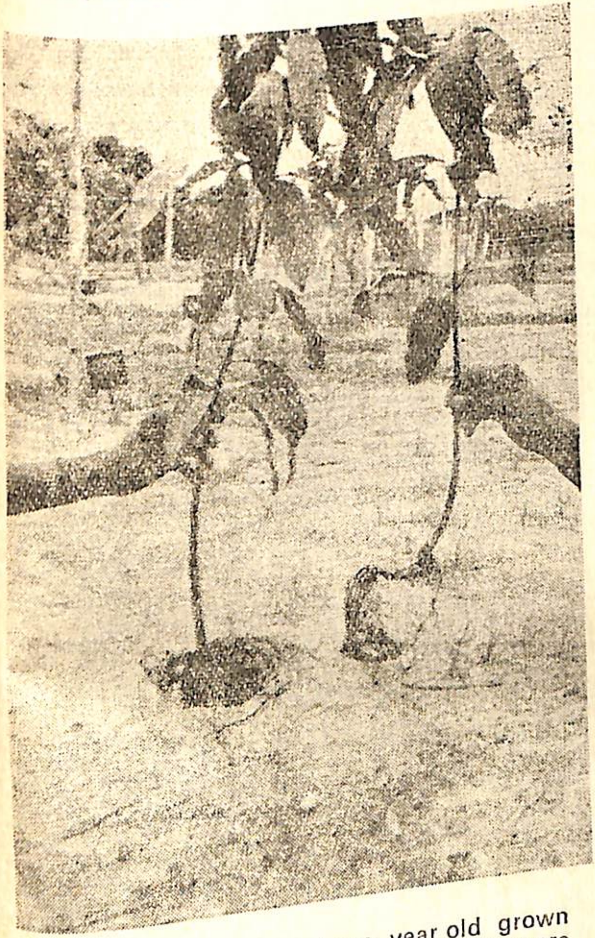
Orissa is endowed with bountiful nature with green and lush vegetation almost all over. The climatic and edaphic features are extremely favourable for the development of a wide range of economic crops such as fruits, vegetables, spices and plantation crops. The whole state of Orissa can be converted into a varitable garden. According to the land utilisation statistics of 1975-76, the area under culturable waste and fallow amount to 11,36,000 hectares, a major portion of which can be devoted to fruits and other plantation crops. Again, of the total cultivable area of 74,10,000 hectares high land account for 34,61,000 hectares a substential portion of which can be devoted to potato, vegetables, banana, etc. depending on facilities available. Therefore, there is vast scope for extension of horticulture in the State. By sustained effort it would not be difficult to bring an area of 5 lakh hectares under fruits and plantation crops in the coming decade against present acreage of 1·19 lakhs under fruits. The bulk of the area susceptible to horticultural treatment lie in the hinterlands inhabited by the tribal population. For upliftment of the tribal areas, for increasing their standard of living enriching fruit production of the country, and for better living conditions by way of increased wealth, horticulture is the only answer in tribal areas.

Shifting cultivation (called Podu) still constitutes the principal means of subsistence for the primitive tribals inhabiting the inaccessible interior hilly areas. It has been estimated that about 30,000 square Kms. of the State is under podu cultivation. A major portion of these Podu areas can be developed with commercial fruit plantations which will eliminate Podu cultivation.

Perennial plants are of immense value in areas specially affected by frequent drought. It not only stabilises the economy of the inhabitants but also regulates the climatic conditions such as rainfall, vegetation etc. It is a guarantee for minimum livelihood. The drought prone areas should be sufficiently planted with fruit trees.

In recent years, rainfall has been rather inadequate and particularly erratic. Poor and erratic rainfalls are the results of lack of ecological balance between water, plant, and soil. Development of perennial plantation crops with suitable intercrops will help in restoring this ecological balance.

Apart from fruits a variety of vegetables can be grown in the hilly-areas out of season which can supply the coastal tracts. For instance, cabbage, cauliflower, tomato, peas, beans, etc. This will not only add to the income of the people but will supply the much needed vegetables at reasonable rates. The State is endowed with a rich wealth of ornamental plants, particularly orchids, and bulbous plants. There is immense scope for development of ornamental and plantation crops.



Shows a grafted plant of one year old grown in pots. Look at the root system. They are erickled, pot bound and will remain at the surface of soil after planting. The plants will not survive without supplemental irrigation.

Look at the straight and deep root system of an year old seedling. It was seen to travel up to 1·5 meter deep into the soil.

The coastal belt with it's 500 Kms. long coast line offers another potential area for extension of cocoanut, cashewnut, arecanut, sapota etc. Cocoanut plantation in canal embankment represent another area waiting for exploitation. It is estimated that it will be possible to plant 35 lakhs of cocoanut seedlings in the canal embankments which alone will generate an annual income of Rs. 35 crores.

This will generate employment potential at all levels of the society, from the isolated tribal communities up to the unemployed technical graduates.

Apart from high net return expccted from horticulture crops and high yield per unit area, fruits and vegetables are essential parts of human diet. It is recommended that an adult should take at 10 oz. of vegetables and 3 oz. of fruits daily although the actual quantities consumed by developed countries is much more.

After the stones germinate the seedlings are protected by providing tree guards. Picture shows a tree guard made of locally available brushwood. In the back-ground are seen number of such guarded seedlings.

A seedling plant one year after side-grafting. It is a tribal area of Phulbani District.

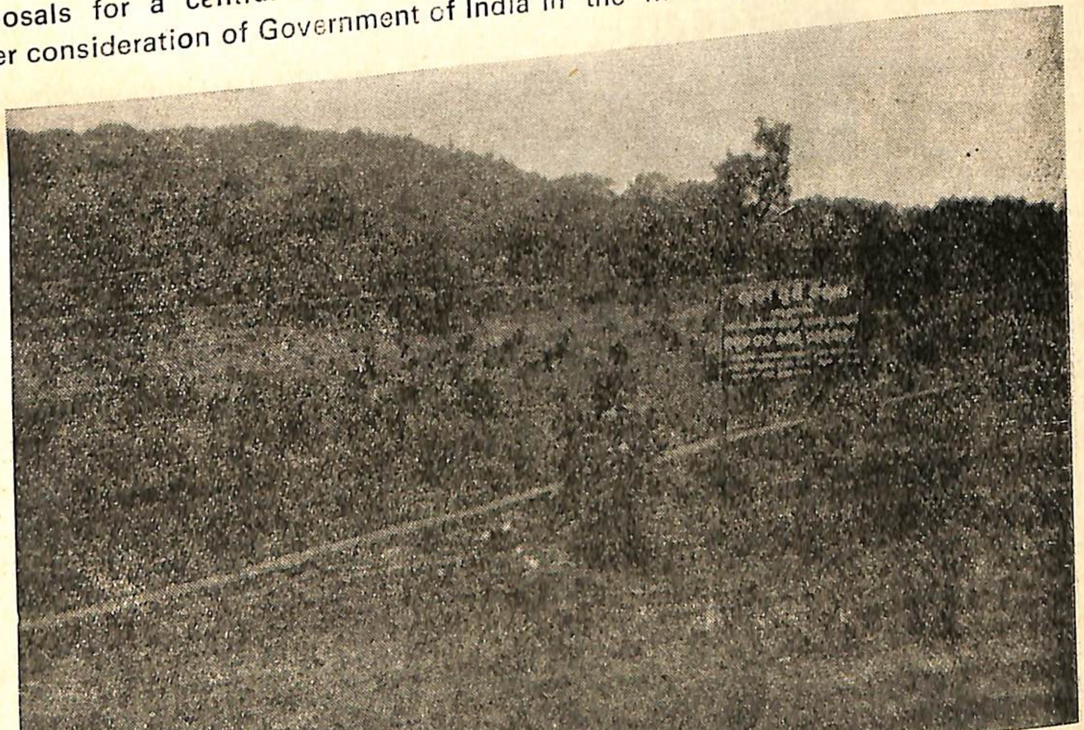
The gross value of fruits and vegetables produced in the State during the year 1975-76 is estimated at Rs. 14,983 lakhs. The value of condiments and spices and cocoanuts for the same period works out to Rs. 3,393 and Rs. 324 lakhs respectively. The total value of these horticultural crops it thus Rs. 18,700 lakhs. This is a very significant contribution to States income. With sustained effort for horticultural development this is bound to increase manyfold.

### Hortisulture Development

Exploitation of agricultural resources of the State has been rather limited and in the past confined to production of rice, other food grains, pulses and oil seeds, while the natural resources available for developing horticultural plantation crops have highly remained unexplored.

The first half of the Fifth Plan has provided the projected break through in horticulture development in the State. The in-situ method of raising plantation with follow up side grafting first taken up as a pilot field trial in July, 1974 has now been established as the standard method of raising horticultural plantation in the rainfed high land areas of the State. The vigourously growing in-situ stock plants with canopies of elite scion have withstood the vagaries of nature over the last two years and have come to flowering. This has opened up the unlimited resources of high land, Podu hill slopes and foot hills of the State for Horticulture development. During this period also the base has been created for production of quality planting scion material including hybrid seed cocoanuts, banana and pineapple suckers. During the year 1976-77 an area of about 4,000 hectares (9997 acres) have been planted with fruit plants like mango, jack-fruit, guava and ber under the in-situ method in 4,97,477 pits. Side grafting operation in 3,000 in-situ raised plants have been done during the year. The horticulture development units have been organised and the field technical staff have been trained to undertake large scale plantation and grafting operations.

The canal embankment plantation of cocoanut has provided promising results. The proposals for a central sector scheme for cocoanut plantation on canal embankment is under consideration of Government of India in the Ministry of Agriculture & Irrigation.



A compact area of about 500 acres planted under G. Udayagiri Horticulture Centre.

Cultivation of exportable varieties of banana has been gaining ground. Besides Kew and Queen varieties of pineapple and the production of local varieties suitable for beverages and canning has been intensified. In addition to the general development of horticulture by way of production of quality planting materials and their distribution to the orchardists with follow up technical field support, the new concept of compact area plantation has been given priority.

A three year old grafted mango tree grown in-situ bearing fruits of Subarnarekha variety in PURI District.

For optimum utilisation of the potential available in the State for horticulture development, a Directorate of Horticulture & Commercial (Plantation) Crops has been created. It is envisaged that this new Directorate will develop the required expertise on Horticulture and Commercial (Plantation) crops with special emphasis on fruit plantation, potato and vegetable development, fruit processing and utilisation of ornamental gardens and beautifications.

During the year 1977-78 in an area of over 3,000 hectares, in-situ fruit plantation has been taken up in over 4,12,000 pits. Special mention may be made of the citrus plantation in Ramagiri-Mahendragiri hills of Ganjam District. During the current season in 11 villages around Ramagiri, 73,850 nuceller orange plants and 2,440 nuceller lime seedlings have been planted. It is rather significant that the existing plantation in the entire belt is of the order of only 70,000 citrus plants.

# Sal Seed—The Money Spinner

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Shri MIHIR KUMAR RAO

Believe it or not, Sal fat extracted from Sal seeds earns of crores foreign exchange, increases palatability of chocolates the world over and provides seasonal employment and income to thousands of tribals in backward areas of the country. These are no wishful thinkings, but the assertions of Messrs. Hindustan Lever, Ltd., catalogued in its advertisement published in the Hindusthan Times, New Delhi (dated the 22nd September 1977) and the Statesman, Calcutta (dated the 16th September 1977). The advertisement further adds that ''Sal fat is a good example of transfer of wealth through technology from the chocolate consumers in Europe to the Adivasis of Orissa!'. While complimenting its research scientists for transforming a forest waste into an international product with several crores per annum of export potential it also gives credit to ''an enterprising forest contractor who offered to organise collection of Sal seeds in the wilds of Orissa''. Thus, Orissa has been brought into focus of an activity about which very little is known to the general public.

Sal seeds, for that matter Sal forests are not only in existence in Orissa but also in States like Madhya Pradesh (37,682 Sq. Kms.), Bihar (33,504 Sq. Kms.), Assam (2,709 Sq. Kms.), Uttar Pradesh (5,768 Sq. Kms.) and West Bengal (5·232 Sq. Kms.). In Orissa the extent of Sal forests is 28,733 Sq. Kms. For ages past some tribals in these States are extracting oil from Sal seeds for domestic purposes. However, the process followed by them is blatantly crude and the endproduct unsuitable for general use.

### Backdrop

But for the inquisitiveness of Dr. Dasarathi Misra, an Oriya Professor of Chemistry, commercial exploitation of Sal seeds for extraction of Sal fat on scientific lines would have remained in oblivion for years to come. Nearly two decades back Dr. Misra thought of transforming this forest waste into a product of universal use. His researches over the years resulted not only in the extraction of Sal fat but also revealed its potentiality for commercial use. Though Dr. Misra did not achieve complete success yet the results obtained gave Shri Jagdish Lath, a forest contractor and the Proprietor of M/S Utkal Contractors and Joinery Private, Ltd., Sambalpur the idea of going in for commercial exploitation of Sal seeds. He, for the first time in India, took up large-scale collection of Sal seeds. Armed with the laboratory process developed by Dr. Misra which showed that Sal fat could be used for edible purpose. He undertook the task of assessing the technical feasibility of extraction of Sal fat by solvent extraction process. His firm M/s. Utkal Contractors and Joinery Private, Ltd., Sambalpur in 1968 referred the case, on contract basis, to Regional Research Laboratory, Hyderabad. The R. R. L., Hyderabad conducted pilot plant experiment on Sal fat in their continuous solvent extraction plant and came to the conclusion that this natural fat could compare well with cocoa butter usually imported for manufacture of chocolates. The technical know-how developed by the R. R. L., Hyderabad enthused the firm to plan for setting up an industrial unit for extraction of Sal fat and it approached the Orissa Government for grant of lease of forests for collection of Sal seeds. A lease for 10 years with a proviso that the proposed industrial unit should be set up within three years from the date of grant of lease, was granted on the 1st November 1969. The lease was in respect of 12 out of the total 25 forest divisions of the State and the royalty fixed was at the rate of Rs. 0·25 paise a quintal with a minimum royalty of Rs. 500 per division for the first three years. The rate was revised at the end of the third year and fixed at Rs. 5 per tonne till 1975. At present collection and sale of Sal seeds are being managed by the Orissa Forest Corporation, Ltd., and the Tribal Development Co-operative Corporation, Ltd.—two autonomous bodies set up by the State Government. Seed collectors are being paid at the rate of 40 paise a kilogram.

The planned industrial (Solvent Extraction Plant) Unit with a capacity of 10,000 metric tonnes was set up at Rairangpur in Mayurbhanj district in 1972. It was christened Orissa Oil Industries, Ltd., Rairangpur. The plant is in operation since September 15, 1972. Subsequently, its capacity was raised to 21,000 metric tonnes. There are today six such solvent extraction plants in the State, the latest being the one set up in June last at Berhampur in Ganjam district by M/s. Aska Central Multipurpose Co-operative Society, Ltd., Aska. The Berhampur plant is the first such plant in the country to be set up in the co-operative sector. Two more plants—one at Bargarh and the other at Kesinga, are on the anvil. Unfortunately, these plants do not get the full quota of Sal seeds for processing. Snags in collection and storage rather than paucity of Sal seeds are the causes, it is said.

No wonder that apart from Sal seeds these plants depend heavily on rice bran and to some extent on other seeds like Mahua, Neem, Polang, Kusum, etc., of forest origin. Queerly enough the end products of these plants have hardly any market in the State. Few in the State care to know how and to where they are being marketed and for what purpose. The little that is known goes to show that some big business houses of Calcutta, Bombay and Madras corner all these products for further processing and eventual sale both within and without the country at a big margin of profit. No organisation—official or otherwise, in Orissa, it seems, is inclined to make a probe and know how best the State's interest can be served.

It may sound paradoxical, but the fact remains that these industrial units hardly get Sal seeds in sufficient quantities to meet their requirements, though the area under Sal forests in the State is quite sizeable. Whereas the extent of Sal Forests in the State is 28733 square kilometers the avarage annual collection of Sal seeds—a minor forest produce of the State—is hardly 20,000 to 25,000 metric tonnes. But according to a rough estimate the Sal seed potential of State is 1·4 million tonnes—the equivalent oil or fat content being 200,000 metric tonnes. However, collection of Sal seeds and extraction of fat therefrom is beset with many problems.

## PROBLEMS

Sal trees start flowering after about 25 years. The flowers blossom in the month of February-March. The flowers are small, white and appear in clusters. The fruit ripens between May end and early June but the exact period varies from place to place. The ripe fruits drop to the ground forming a thick layer under the tree. The State Forest Department a few years back were not permitting collection of Sal fruit in order to ensure natural regeneration. However, of late the Department is allowing collection of Sal fruits before onset of the monsoon. But it is impossible to collect the entire quantity within a period of 3 to 4 weeks. Vigorous collection drive during the period may result in the collection of about 1,00,000 tonnes in Orissa alone. This However is a rough estimate. Untimely rains and inaccessibility of the forests are two impediments usually encountered in the collection drive. Besides, fruiting of Sal trees follow a seven-year cycle—as a result the yields are not uniform all the years. Increased collection calls for adequate storage facilities which are yet to be developed in the State.

## MECHANICS

The fruit, i.e., the seed consists of a hard hull and wings and the soft kernel. Sufficient drying usually Sun drying for a couple of days is sufficient for decortication, i. e., removal of the hard hulls and wings. The seeds need to be decorticated before they are marketed. Though for efficient decortication mechanical decorticators have been developed in the country, in Orissa decortication is still being done mannually (with the help of sticks) by the Adivasis. The cost of collection of undecorticated seeds is about Rs. 20 to Rs. 25 a quintal while that of decorticated seeds is about Rs. 40 per quintal. The decorticated seeds (sal kernels) stored in bags are liable to fungus and insect attacks. The starch content of sal kernels is high, fat content about 16 per cent and protein contain is rather low. Compared to other oil seeds, extraction of fat from Sal seeds is a difficult process. Il has already been proved that solvent extraction is a must for optimum extraction of the fat. The fat thus obtained is greenish yellow in colour and has a disagreeble odour. When exposed to Sun light the fat is bleached white. So, light bleaching is being adopted prior to absorbent bleaching. Sal fat in original state is used in soap industry and can be used in the manufacture of some lubricants and candles, but it is not comparable with cocoa butter. Some more chemical treatments are necessary to make it a suitable alternative to cocoa butter. Some of the big industries like M/s Hindustan Lever Ltd., most probably have perfected these processes which they keep as a trade secret.

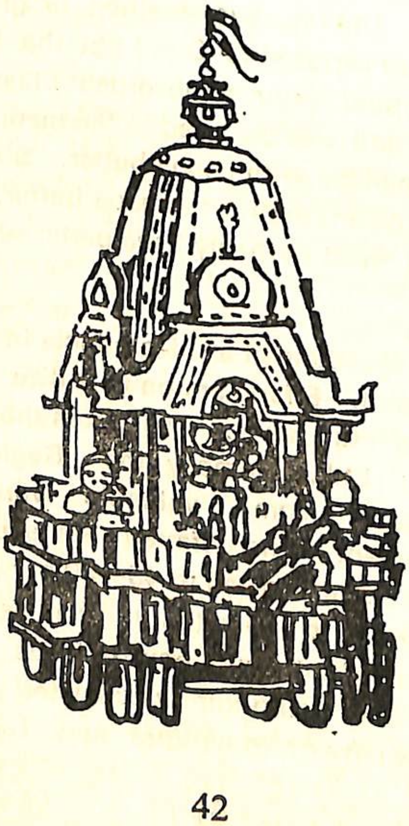
The defatted Sal seed meal obtained as bi-products in the solvent extraction plants is as important as the Sal fat itself. Efforts are on to utilize the meal as an ingredient for the manufacture of cattle and poultry feeds. Apart from the pioneering work done in the field by M/s Hindustan Lever, Ltd., Bombay the Regional Research Laboratory, Bhubaneswar have also done some valuable works. It has developed a process by which the Tanin content of the defatted Sal seed meal can be reduced to four (4) per cent and the starch content raised to 45—50 per cent from the existing 30—40 per cent. With this improvement, it is hoped that the Sal seed meal will be used to a larger extent in the manufacture of catte and poultry feeds. The nutritional value of the so-processed Sal seed meal is now being jointly evaluated by Regional Research Laboratory, Bhubaneswar, Orissa University of Agriculture and Technology, Bhubaneswar and the Central Training Institute of Poultry Production and Management ( I C A R ), Bangalore. Needless to say that the estimated present demand of deoiled Sal seed meal in the domestic compound-feed industry is about 60,000 tonnes per annum.

## PROSPECTS

Sal fat is still to make the grade insofar as edibility is concerned. Judged in this context there is plenty of scope for further research on utilisation of Sal fat and Sal seed meal. Many scientific organisations such as the Regional Research Laboratories at Hyderabad and Bhubaneswar, Oil Technological Research Institute, Anantapur ( Andhra Pradesh), Harcourt Butler Technological Institute, Kanpur, M/s Hindustan Lever, Ltd., Bombay, National Dairy Research Institute, Karnal and its Southern regional centre at Bangalore, Central Leather Research Institute, Madras and Forest Research Institute, Dhera Dun are busy studying various aspects of utilisation of Sal seeds. Besides, Dr. Dasarathi Misra and Professor Kane of Department of Chemical Technology, Bombay are also at it.

The solvent extraction plants now in Orissa are not the only ones in the country. In view of the present countrywide scarcity of edible oils, Sal fat deserves greater attention. Once it passes the rigid edibility tests its impact on the country's Vanaspati industry, will be considerable. Though considered as a minor forest produce Sal seeds has the potentiality of augmenting many industries, such as Vanaspati, cocoa butter, cattle and poultry feed, textile, paper, leather, particle and paste board, etc., in the country. The key however lies with the Government, enterprising industrialists and research scientists.

P. I. B., Cuttack



# DRYLAND AGRICULTURE IN ORISSA

Dr. P. C. GHOSH

## 1. Introduction

In Orissa, out of a total cultivated land area of 6·69 million hectares, only 1·38 million hectares (both Kharif and Rabi) i. e. about 20 per cent have some Irrigation facilities. Thus agriculture in Orissa is, by and large, rainfed and it may remain such for a long time to come since the present resources of the State may not permit heavy investments in costly irrigation projects. As the economy of the State is mainly dependent on agriculture, this is going to be influenced to a large extent by the productivity of drylands, which form nearly four-fifth of the total cultivated land area. Thus the importance of dryland agriculture (which is now commonly used to denote non-irrigated agricultural operations) for Orissa cannot be overemphasized.

Orissa has a hot and humid climate with marked dry and wet seasons. The average annual rainfall is about 1,500 mm. of which about three-fourth is received during the months from June to September which period is the main cropping season of the State. Winter rainfall is generally scanty.

Several broad soil groups occur in the State. These are alluvial soils, red and lateritic soils, laterite soils, mixed red and black soils, mixed red and yellow soils; black soils and saline soils. The red soil is the major soil group of the State.

## 2. Problems of Dryland Agriculture

An important problem connected with crop production in rainfed areas of the State is the uncertainty of the monsoon rains. In some years, the moonsoon may break as early as first week of June while in other years its onset may be delayed till the last week of June or first week of July. The occurrence of drought spells in July, August, September and October of varying duration is unpredictable and is primarily responsible for partial on complete crop failure. Crops grown on uplands suffer the maximum loss due to incidence of drought.

The upland rice crop is most vulnerable to drought injury. The medium and low lands where rice is grown under submergence also face severe moisture stress during rainless period of 10—15 days duration. If the crop is at the milk stage on flowering stage, lack of adequate moisture reduces the grain yield significantly.

Water is not the only constraint limiting agricultural production in drylands. The red and laterite soil groups which commonly occur in the dryland areas of the State are generally deficient in many major and micronutrients due to excessive leaching and erosional losses in the past. Besides, these soils are generally acidic in reaction—the PH ranging from 5·0 to 6·5. Several crops particularly pulses, groundnut and maize are sensitive to high acidity and their yields are very low under acidic condition.

Some other problems of dryland agriculture are poor crop planning, poor soil water and crop management unsatisfactory land use, non-adoption of improved agro-techniques, and backward socio-economic conditions of the dryland farmers. Thus, the stabillzation of crop yields in the rainfed areas of the State poses a challenging problem to planners, administrators, research scientists and extension workers.

### 3. Cropping patterns for Rainfed Areas

The cultivated land is usually classified in to four classes for purposes of agricultural planning—

(a) High upland (locally 'At')

(b) Upland (locally 'Mal' or 'Beali')

(c) Medium land (Locally 'Berna' or 'Laghu')

(d) Low land (Locally 'Bahal' or 'Sarad')

In some of the interior hilly districts of the State such as Phulbani, Keonjhar, Koraput and Sundargarh, high uplands and uplands may constitute about 58 to 60 per cent of the total cultivated area. The cropping patterns generally followed at present and those recommended for various classes of land are given below:

| | Present cropping pattern | Recommended cropping pattern |
|---|---|---|
| A. High upland | (Kharif) | (Kharif) |
| | Early rice (local) Minor millets | Arhar (R-60) |
| | | Mesta (AMV-1) |
| | (Rabi) | (Rabi) |
| | Fallow | Arher to continue |
| B. Upland | (Kharif) | (Kharif) |
| | Early rice (local) | Ragi (early group) |
| | Minor millets, | Very early rice |
| | Maize, sesamum (local) | (75-90 days) |
| | Vegetables | Maize (comferte Hybrid) |
| | (Rabi) | Jowar (comperte hybrid) |
| | Niger (in Interior districts) | Ragi+Arhar (R-60) |

| | Present cropping pattern | Recommended cropping pattern |
|---|---|---|
| | Horsegram | Maize+Arhar (R-60)<br>Groundnut<br>Green gram<br>Blackgram<br>Cowpea |
| | | (Rabi) |
| | | Horsegram<br>* Arhar (S-5)<br>* Castor, |
| C. Medium land | (Kharif) | (Kharif) |
| | Rice medium duration (local). | H.Y.V.Rice, 115-120 days (Ratna Kumar) |
| | (Rabi) | (Rabi) |
| | Fallow | Mustard (M-27)<br>Linseed (T-397)<br>Sunflower (7-13-3)<br>Barley (DL-3) |
| D. Low land | (Kharif) | (Kharif) |
| | Rice late duration (local) | Rice improved (T-90, CR-1014, BAM-6) |
| | (Rabi) | (Rabi) |
| | Greengram (local)<br>Field pea | Castor<br>Sunflower<br>Field pea |

Arhar (S-5) & castor should be relay cropped 15 days before the harvest of the Kharif crop in September

## 4. Research Findings---

In the last six years research work on various aspects of dryland agriculture has been carried out at Bhubaneswar and Joshipur (for the last two seasons). Some of the important findings are discussed below.

*(a) Crop substitution*—In respect of upland rice, it has been observed that only varieties of very early group (duration 90 days on less such as CRM 13-3241, Parijat, DR-92) have a reasonable chance of success in the coarse textured upland lateritic soils. Even these face the risk of failure in drought hit years. As against this experience, other upland kharif crops such as ragi, and pulses like greengram, blackgram give a good performance with much less yield fluctuation over the years (Table-1). Hence, for stabilizing production in rainfed upland farmers should divert at least one-third of their upland areas to crops like Ragi, or pulses (greengram & blackgram) instead of covering them entirely with tradionally grown upland rice.

*(b) Sequence cropping*—For increasing the cropping intensity in uplands, horsegram/ Arhar (S—5) can be grown after harvesting the Kharif crops like Ragi, upland rice, maize groundnut etc. in September. These two crops have been found to utilize the stored soil moisture quite efficiently. The prospect of stand establishment and yield is much better if horsegram and Arhar (S—5) are sown as relay crops in early September before the harvest of Kharif crops.

In the rainfed medium land situation, the sequence rice (variety, Kumar) Linseed (T. 397) has proved to be the most remunerative growing a net return of Rs. 443 per hectare.

One year's result (1976 season) under medium land situation has shown that it is possible to have two successive harvests of rice crop with a total production of 5 tons per hectare. An early duration variety (DR-92 parijat) maturing in 90-95 days is dry sown towards last part of may and harvested by first week of September. Immediately after harvest, old seedlings of Jagannath variety rice are transplanted and this crop is harvested in December.

(c) *Intercropping*—Several intercropping systems for coarsetextured lateritic uplands have been studied. The most promising systems are as follows:—

| | | Average Net return (Rs./hectare) |
|---|---|---|
| 1. Arhar (R-60)+Ragi (intercrop) (2:4) | .. | 1560 |
| 2. Maize+Arhar (R-60) (1:1) | .. | 1865 |

(d) *Use of soil amendments*—As acid soils cover about two-third area of the State soil acidity is a major constraint limiting production of pluses groundnut, maize and possibly other crops. Data obtained at Bhubaneswar have conclusively shown the benefit of lime on acid soils for getting higher yield of these crops. Paper mill sludge (a waste by-product of paper factories) can be used as a cheap source of lime in areas not far from paper factories. For coarse-textured acid soils (pH about 5·0) a dose of 3 tonnes per hectare of paper mill sludge should be ploughed down at the time of land preparation.

(e) *Water-harvesting and Run-off utilization*—In a pilot study on water-harvesting, the surface run-off from gently sloping and cropped microwater sheds was collected in polythene lined tanks (40 Cu. metre capacity) for subsequent supplemental irrigation of the Rabi crops. The collected run-off was sufficient to give three supplemental irrigations of 5 cm. each for the entire donor area cropped to sunflower and blackgram grown in sequence with upland rice and Ragi. This supplemental irrigation resulted in an extra yield of 1 q/ha of blackgram & 2·5 q/ha of sunflower.

(f) *Reduction of seepage loss from tanks*—Out of several lining materials tried to minimize seepage losses from water storage tanks, soil-cement mixture (10:1) 8 cm. thick costing about Rs.6.40 per Sq.m. appeared to be most promising.

(g) *Ridge and Furrow method of cultivation*—This system of cultivation on slopy lands (3 per cent slop) with crops like blackgram/Arhar/Maize on ridges and either rice (short duration) on Ragi in the furrows has certain promise for such type of lands. Yields of crops under ridge planting are usually higher than those under flat planting.

(h) *Efficient crop varieties for rainfed lands*—

| Crop | | Variety | | Average grain yield (q/ha) |
|---|---|---|---|---|
| 1. Upland rice | .. | DR-92 | .. | 24·0 |
| | | Parijat | .. | 19·0 |
| 2. Ragi | .. | PR-717 | .. | 24·8 |
| | | Sikri | .. | 21·7 |
| | | A 2-3-4 | .. | 21·3 |
| 3. Greengram | .. | Kopergaon | .. | 8·5 |
| | | K-851 | .. | 7·6 |
| 4. Blackgram | .. | T-9 | .. | 10·2 |
| 5. Arhar (Redgram) | .. | R-60 | .. | 8·9 |
| | | Kanke-9 | .. | 8·2 |

## 5. Management practices

(a) *Early sowing*—For success in dry land agriculture, earlier sowing is a necessity. This may enable the crop to escape drought spells occurring later in the season and also may help to escape major pests and diseases. Crops like Mesta, greengram even can be sown as early as first fortnight of may with a few pre-monsoon shows without facing risk of failure. Early sowing of Rabi crops ensures the crop additional moisture from late kharif rainfall,

(b) *Line sowing*—In dryland areas of the State, broadcasting is the most common practice of sowing seeds of dry land crops. This practice should be replaced by line sowing either with the use of a seed-drill on a plough fitted with a funnel tube for dropping seeds. Line sowing facilitates cultural operations like weeding, hocing, and also fertilizer placement.

(c) *Weed control*—As weed population severely compete for water and nutrients it is essential to eliminate weeds from cropped fields by adopting timely mechanical or chemical weed control measures.

(d) *Seed treatment & Plant Protection*—Before sowing, the seeds should be treated with certain chemical like Agrosan G. N./Ceresan/Captan etc. to reduce the risk of spread of certain seedborne diseases.

Adequate plant protection measures as recommended by the Department of Agriculture should be adopted to check the incidence of pests and diseases.

(e) *Use of organic mannures, fertilizers & Soil amendments*—As mentioned earlier. use of lime or acid soils is beneficial. Most of the soils of Orissa are usually different in nitrogen and phosphorus and as such adequate fertilizer use is necessary to obtain good yields. The farmers should be guided by soil test results and follow the recommendations. Moderate doses of fertilizers give economical returns. The use of bulky organic mannures like farmyard mannure and composts improves the structure and helps in moisture retention, apart from supplying major and micro nutrients.

(f) *Choice of proper crop varieties*—The choice of proper crop varieties for different types of rainfed lands is very important. Short duration varieties with high yield potential should usually be preferred. A list of varieties of some crops recommended for dryland conditions is given earlier.

*(g) Maintenance of optimum plant population*—One of the reasons for getting low yields of dryland crops is lack of optinum plant population. Farmers should pay adequate attention for maintenance of proper plant population.

## Conclusion

The productivity of dry lands can be increased subatantially if the farmers in these areas pay attention to proper crop planning and follow the proper management practices some of which have been mentioned in the preceding paragraphs. The results of large number of demonstrations conducted in the Dryland Developmvnt Project at Bahalda in Mayurbhanj district on rice have convincingly shown that some of the existing high yielding varieties of rice are capable of yielding on an average up to 40q/ha wilh moderate doses of fertilizers. The extension workers have to play a key role in educating the farmers about the importance of crop management practices and can thus improve the managerial ability of the dryland farmers.

TABLE 1

Yield of some upland Kharif crops in different years (Bhubaneswar)

| Crop | Variety | Grain yield (Q/ha) | | | | |
|---|---|---|---|---|---|---|
| | | 1972 | 1973 | 1974 | 1975 | Average |
| Upland rice | 1. Bala | 16·65 | 35·55 | 4·66 | 17·26 | 18·53 |
| | 2. Parijat | 19·25 | 36·07 | 3·52 | 20·37 | 19·80 |
| | 3. D. R.—92 | .. | 45·86 | 5·07 | 23·45 | 24·79 |
| Ragi | 1. Dibyasinha | 21·56 | 21·19 | 15·47 | .. | 19·41 |
| | 2. A 2—3—4 | .. | 23·92 | 20·38 | 19·52 | 21·27 |
| | 3. A. K. P.—2 | .. | 18·84 | 20·83 | .. | 19·83 |
| | 4. Sikri | .. | 20·53 | 22·91 | ... | 21·72 |
| Greengram | 1. Kopergaon | 9·55 | 6·92 | 9·27 | 4·79 | 7·63 |
| | 2. K—851 | .. | .. | 9·87 | 5·23 | 7·55 |
| | 3. Kanke multipurpose. | 10·47 | 7·99 | 7·38 | 4·12 | 7·49 |
| Blackgram | 1. T. 9 | 12·59 | 11·89 | 5·99 | .. | 10·16 |
| | 2. U. P. U—1 | 11·12 | 12·36 | 5·32 | .. | 9·93 |

..........

Chief Scienfist
Dryland Agriculture Research Project
O. U. A. T., Bhubaneswar

# Freshwater Aquaculture Research and Training Centre, Dhauli

## 624, Sahid Nagar, Bhubaneswar, Orissa

Freshwater Aquaculture Research and Training Centre is the headquaters of the Freshwater Aquaculture Division of the Central Inland Fisheries Research Institute (Indian Council of Agricultural Research), Barrackpore (West Bengal).

**Objective;**

The objective of the Freshwater Aquaculture Division is to study and elucidate scientists' principles which can be applied for full utilization of all available freshwater bodies of the country for maximising fish production therefrom. The fulfilment of such an objective requires conducting investigations on the biology of important food fishes; studying hydrology and ecology of freshwater bodies; evolving techniques for breeding culturable freshwater fishes and their nursing; formulating feeds of high conversion value; devising fish breeding procedures; and acquiring environmental control of freshwater bodies to maximise per hectare yield of fish at economical price.

**Organizational set up;**

The principal sections that presently function under the Division are—

(a) Pond culture;

(b) Fish breeding;

(c) Exotic fish culture;

(d) Weed control;

(e) Soil chemistry;

(f) Frog culture;

(g) Fish farm engineering;

(h) Fish pathology.

All these sections have been functioning since 1949 at 19, Cantonment Road, Cuttack, with an improvised farm in the ancient fort moat at Killa. This farm belongs to the State Department of Fisheries and has placed at the disposal of the Freshwater Fish Culture Division of the Central Inland Fisheries Research Institute. Once the Freshwater Aquaculture Research and Training Centre at Dhauli is built up, the entire Division will shift to Dhauli. A Krishi Vigyan Kendra and Trainers' Training Centre have been added to the Freshwater Aquaculture Division.

**Projects contemplated to be tackled;**

The Freshwater Fish Culture Division is working on the following projects arranged in order of their priority which in turn is based on the productive potential of the projects:—

1. *Optimum per hectare production of fry, fingerlings and fish in culture fishery operations* (*with 40 concrete research problems*);
2. *Induced fish breeding* (*with 6 research problems*);
3. *Exotic fish culture* (*with 6 research problems*);
4. *Selecteive breeding and hybridization* (*with 4 research problems*);
5. *Economics in fishery investigations* (*with 6 research problems*);
6. *Weed control* (*with 9 research problems*);
7. *Fish farm designing* (*with 2 research problems*);
8. *Sewage-fed fisheries* (*with 2 research problems*);
9. *Freshwater prawn culture* (*with 4 research problems*); *and*
10. *Frog farming* (*with 10 research problems*).

The All-India Co-ordinated Research Project on Composite Fish Culture and Seed Production will also be functioning at Dhauli in conjunction with the Freshwater Fish Culture Division. It has 17 research problems. Its centres are located in six States of the country, viz., (1) Haryana, (2) Andhra Pradesh, (3) Maharashtra, (4) Tamilnadu, (5) Uttar Pradesh and (6) West Bengal. Three more centres one each in Orissa, Madhya Pradesh, and Gujarat are being added to it now.

**Area, cost of building, etc.**

The total area at Dhauli is 144 ha where the Freshwater Aquaculture Research and Training Centre will be located. The costs—

| | Rs. |
|---|---|
| Land including its survey | .. 7·25 Lakhs |
| Boundary wall | .. 6·37 Lakhs |
| Laboratory building | .. 38·62 Lakhs |
| Bulk services and development | .. 33·25 Lakhs |
| 94 residential quarters | .. 30·80 Lakhs |
| Hostel | .. 7·42 Lakhs |

To formulate the quantum and nature of United Nations Development Programme contribution towards development of Freshwater Aquaculture Research and Training Centre at Duahli, 2 FAO Consultants had been here.

The total cost of the Fish Farm at Dhauli is expected to be of the order of Rs. 4 crores.

It is contemplated to locate a Post-Graduate Centre for education in Fisheries at Dhauli with World Bank assistance. The World Bank will also give support for strengthening research especially in the fields of fish physiology, feed formulation, farm economics, fish diseases, farm designing and intensive fish culture.

**Salient points of work of public interest already accomlished and composite fish culture**

### FISH CULTURE

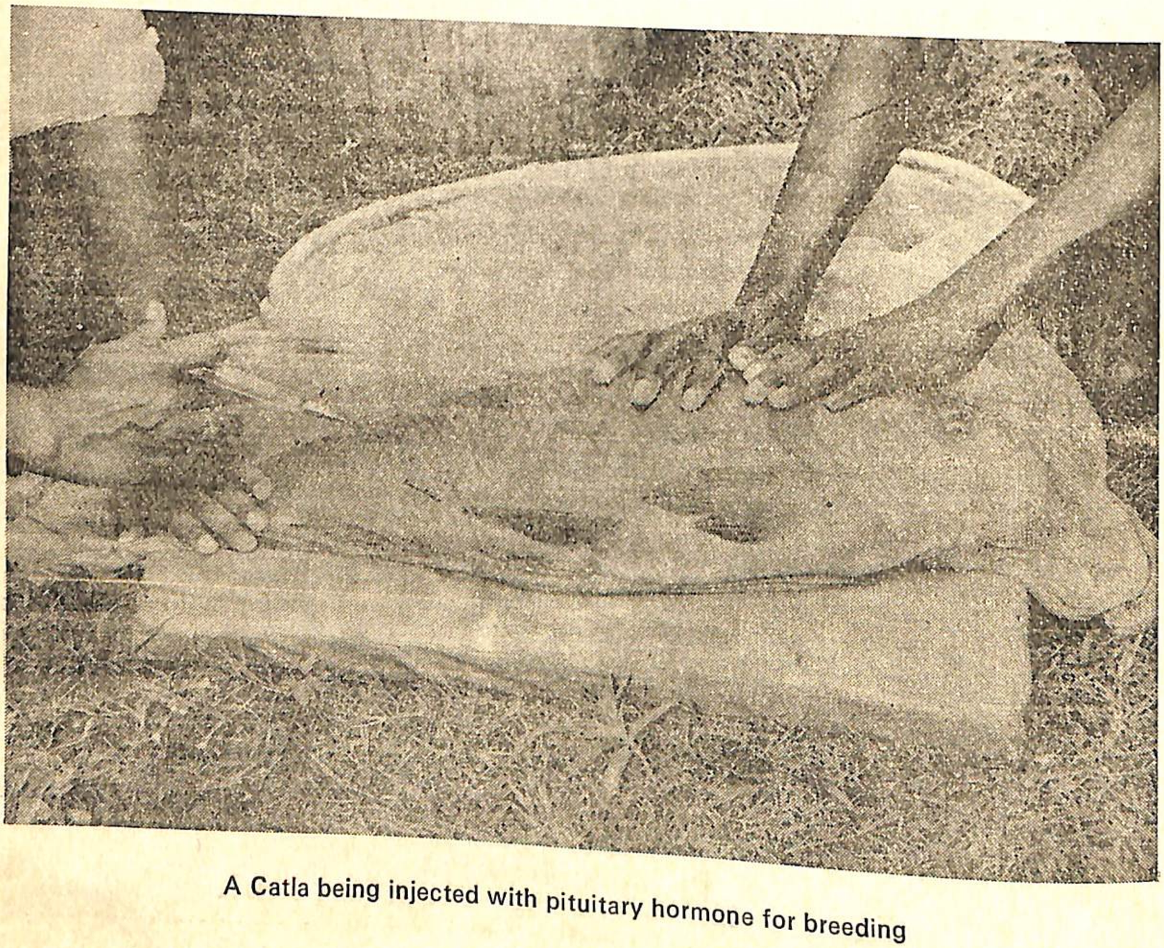
1. Epoch-making strides have been made in the field of production of marketable fishes in freshwater ponds. The methology evolved has come to be widely known as 'Composite fish culture'. This has reached its present state of extraordinarily high production rate (compared to the country's average of 600 kg/ha/yr) after a decade of research at the Freshwater Fish Culture Division at Cuttack. With gradual improvements made, it has been possible to achieve a maximum production of about 9,400 kg/ha/yr which is comparable to the highest production recorded in still water ponds in the world. The cost of production, taking into account the operational costs works to about Rs. 2·50 per kg. of fish which is attractive commercially particularly because it would command high prices in the market.

A 9 toune per ha/yr haul of major Carps

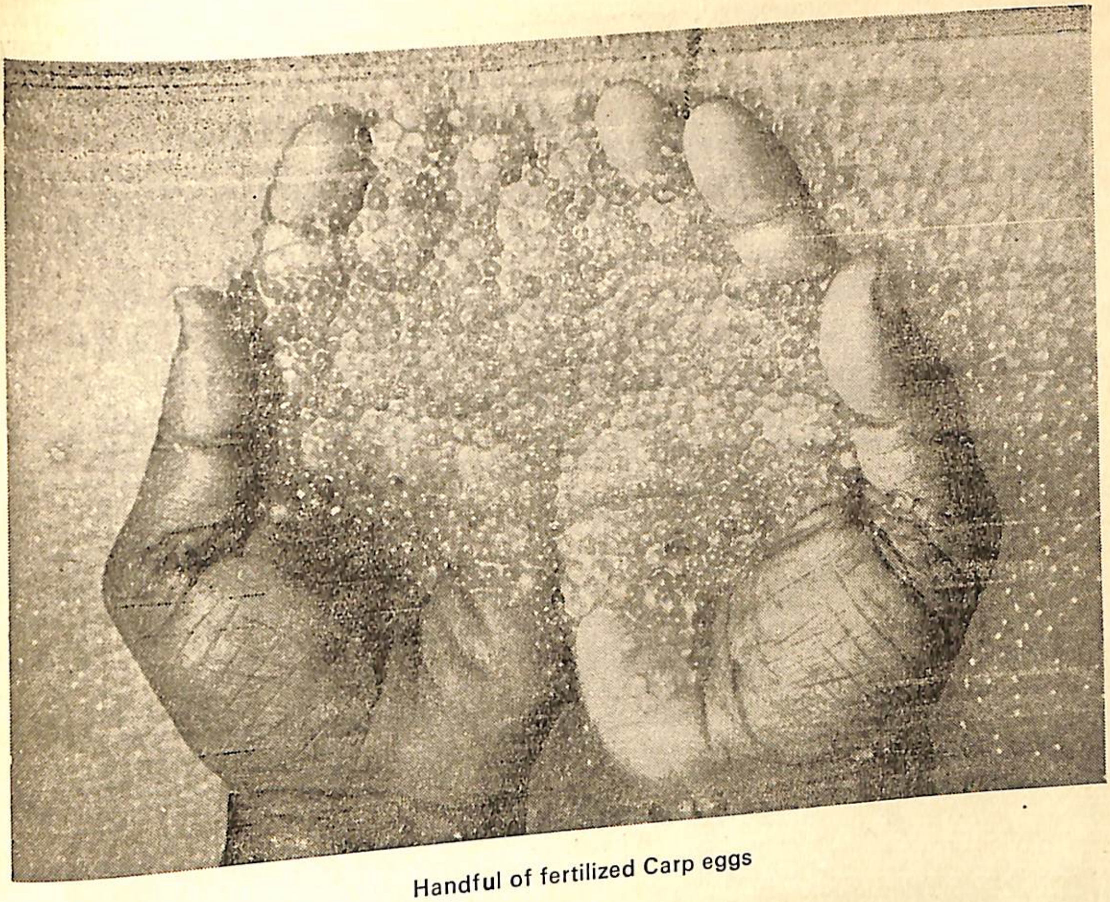
2. An All-India Co-ordinated Project on Composite Fish Culture in several States under different agro-climatic conditions are already functioning since 1971 and excellent results have been obtained. Field demonstrations by this Division in ponds of a fish farmer under the *"National Demonstration Scheme"* of the Indian Council of Agricultural Research yielded an average production of over 7,500 kg/ha/yr. The same technology is being applied to scores of ponds in Orissa and West Bengal under CIFRI/IDRC Project with commendable results. With this, freshwater aquaculture can be considered to have come of age in India and this break-through has brought fish farming to the take-off stage and made it feasible to be undertaken as a profitable industry.

## FISH BREEDING

3. Development of the method of induced breeding of Indian major carps in confined waters by administration of pituitary hormone, called 'hypophysation' is a great scientific milestone reached for the first time in the sub-continent and is the most important development in the progress of fish breeding in India. This technique is the only dependable source of quality fish seed and seeks to revolutionize fish culture. It has also opened a new line of research on selective breeding and hybridization aimed at evolving superior strains of fish for higher production. A number of interspecific and intergeneric hybrids have been produced, some of which have shown superior qualities than the parent species.



A Catla being injected with pituitary hormone for breeding



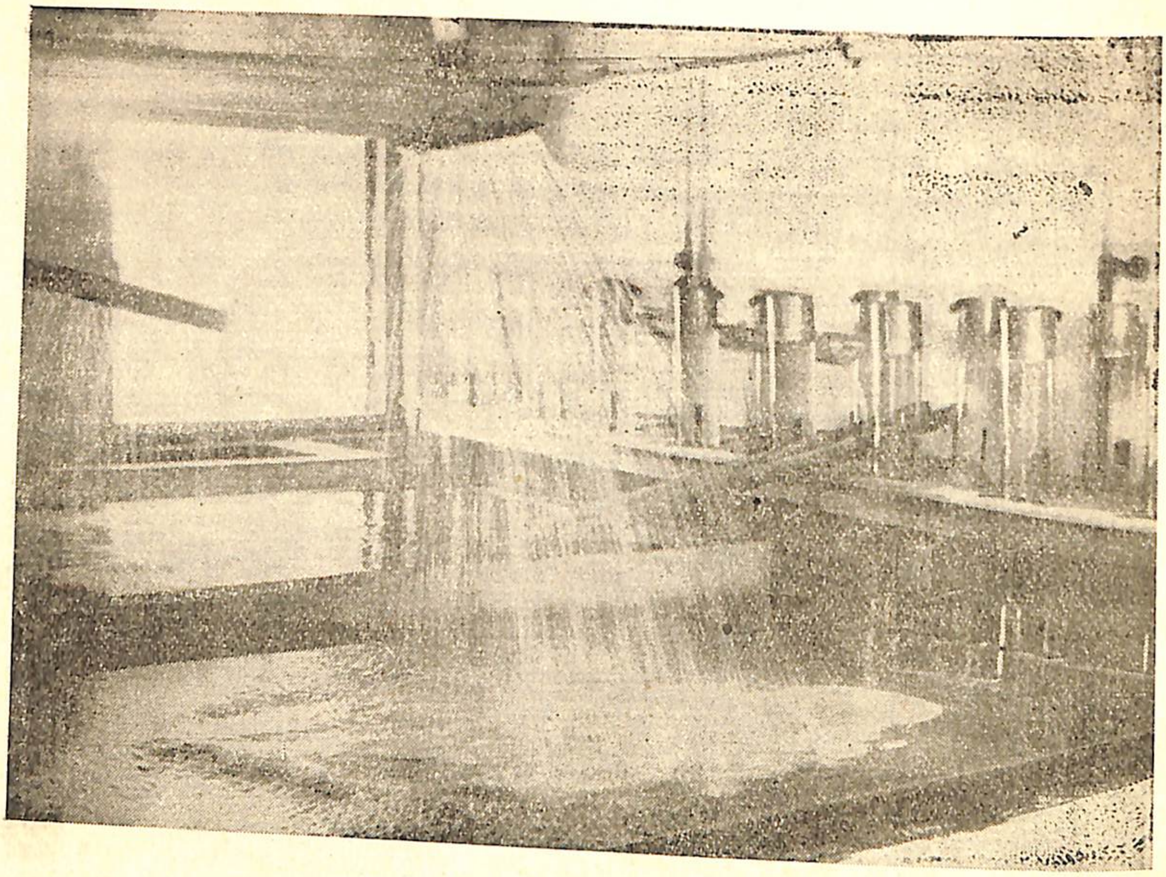
Handful of fertilized Carp eggs

4. The exotic Chinese silver carp and grass carp imported into India were bred in still waters for the first time at the Freshwater Fish Culture Division at Cuttack by application of the technique of induced breeding by hypophysation. As in the case of Indian major carps, the technique was successfully applied for lage-scale production of seed of the exotic carps. The latter have been distributed to various States of India for culture and propagation.

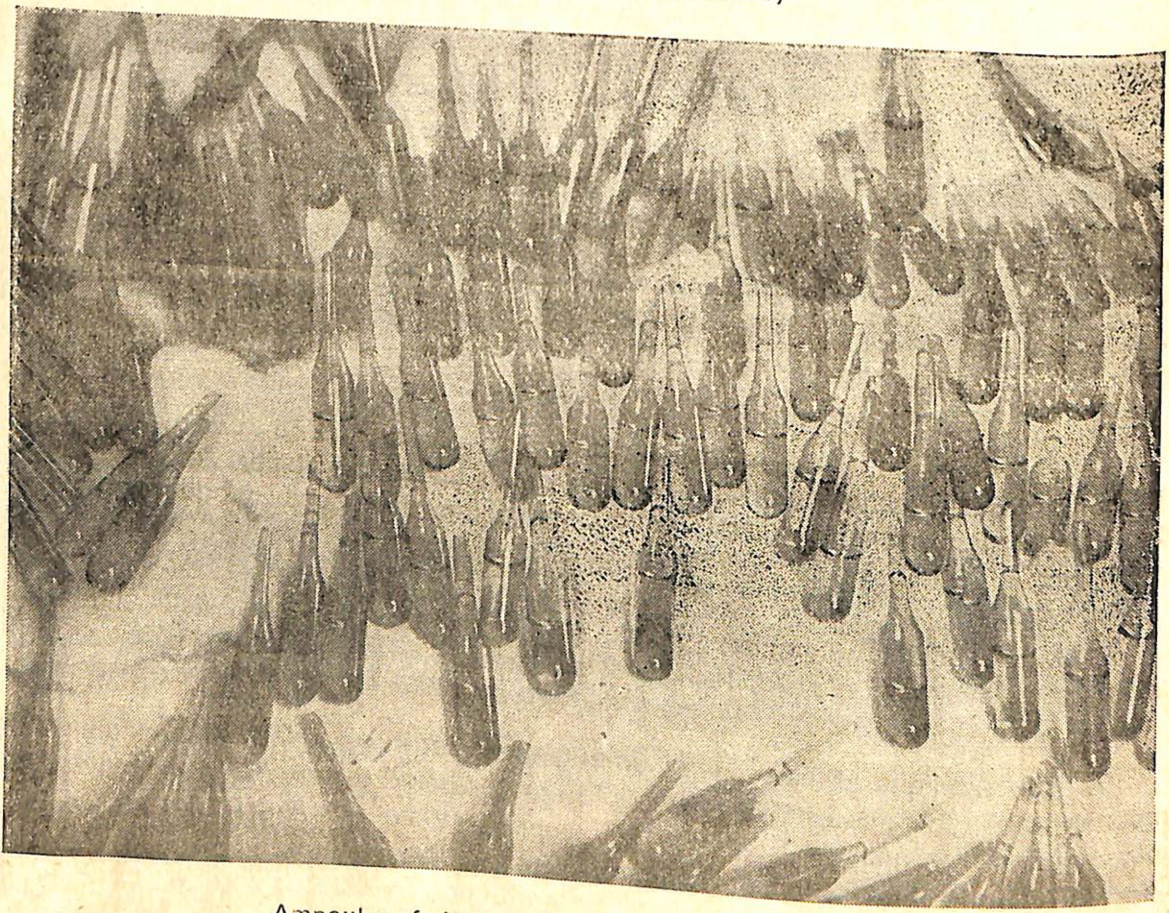
5. The success in inducing the Indian major carps to breed twice within a period of two months is highly significant in that it opens up the possibility of multiple breeding, prolongation of the breedings period, enhancing fish seed production, demostication, etc.

6. A carp hatchery complex, which eliminates much of the field hazards and enhances survival of fish seed, has been established.

7. The technique of preserving pituitary extract in glycerine andampouling is an important step towards establishment of 'pituitary bank' to serve as a readily available source of 'injection materials'. About 900 ampoules were distributed to State Fishery Departments, Agricultural Universities and private pisciculturists. Recently, a supply has been made to FAO, Rome, as India's contribution for establishing a pituitary bank.



A hatchery
This is a miniature fish seed factory



Ampoules of pituitary gland extract ready for use

## Weed control;

8. The discovery at the Division of the efficacy of ammonia as a weedicide against aquatic weeds, has a great significance in view of its beneficial side-effects in the fish pond environment and the moncumulative and transient nature of its toxicity.

9. A method and technique of using 2,4-D in precise minimum doses to clear choked up water surface of dense infestations of water hyacinth have been evolved and demonstrated in the field. 2,4-D, which is safe to use, has also been found effective in controlling the fast spreading up weed meance *Impomoea carnea*. This technique has been accepted by several local bodies for widespread application as it has been found more economical than clearance by manual labour.

Spraying 2, 4-D formulation on a dense infestation of water hyacinth

## Biological control of weeds;

10. The grass carp, a voracious feeder of many varieties of noxious aquatic weeds, has been used as an agent for biological control of weeds. The fish supplied by the Division to the Bhilai Steel Plant have checked the growth of submerged weeds in their large water supply reservoirs. Technical guidance for this was provided by the Division. Fingerlings have also been supplied to many other agencies.

**Making available the know-how;**

11. The technical know-how developed by the Division through years of research is made available to agencies like State Fisheries Departments, Government Undertakings, etc., and also to trainees (including foreigners) and fish farmers through seminars, workshops, training and refresher courses, lectures, talks, demonstrations, etc.

12. Much of today's fresh water aquaculture development in the country is linked directly or indirectly to help, advice, and assistance rendered by the Central Inland Fisheries Research Institute.

13. The FAO organized a Seminar on "Induced Breeding of Cultivated Fishes" at Barrackpore (West Bengal), Cuttack (Orissa), and Bombay (Maharashtra) in 1969. This was an event of which the whole country is prouded of. The Director of the Seminar was Dr. V. G. Jhingran, the Director of the Central Inland Fisheries Research Institute.

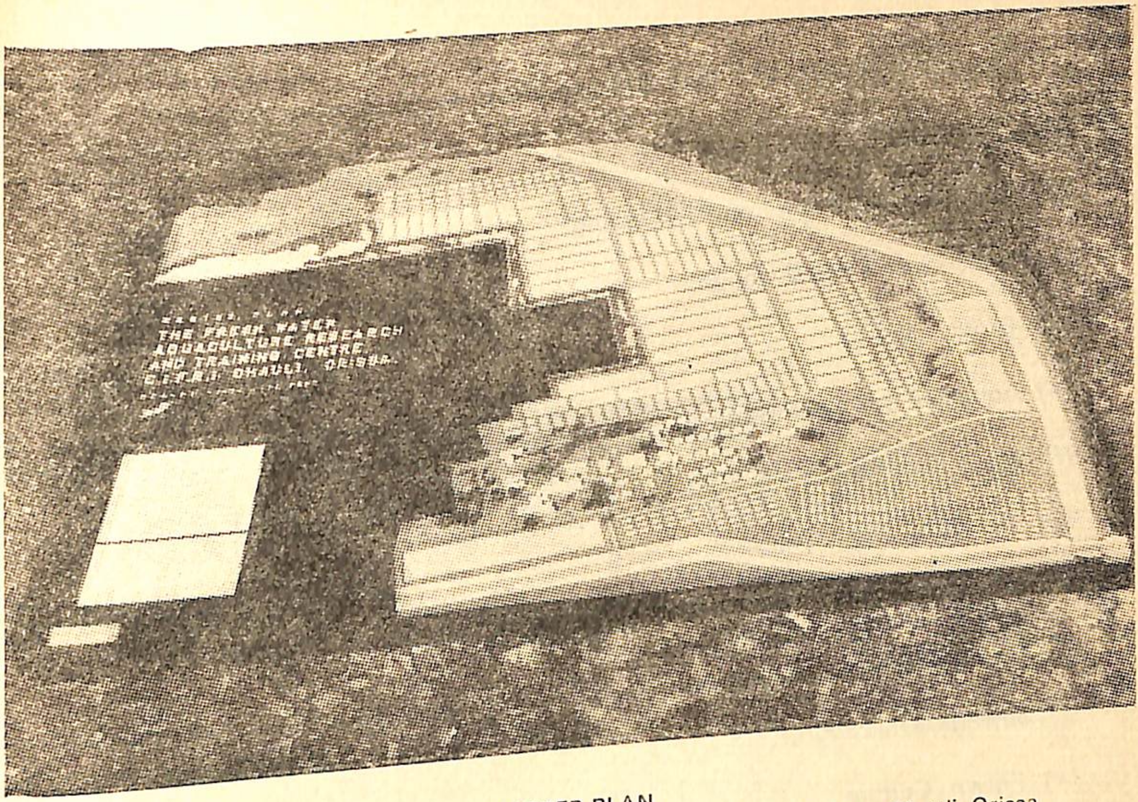
14. In view of the importance of the development of inland fishery resources of South and South-East Asia, the FAO recently held a Symposium in Colombo, Sri Lanka, on "Development and Utilizstion of Inland Fishery Resources", of which Dr. V. G. Jhingran, Director of the Central Inland Fisheries Research Institute, was the Chairman.

15. An educational film "Induced Breeding" based on the technology developed by the Freshwater Fish Culture Division, Cuttack, won the First Prize at the FAO Technical Conference on Aquaculture, recently held in Kyoto, Japan. The same film had earlier won the "Silver Ear" under the instructional category at the Berlin Film Festival in 1975. It also won a Presidential Award in 1976.

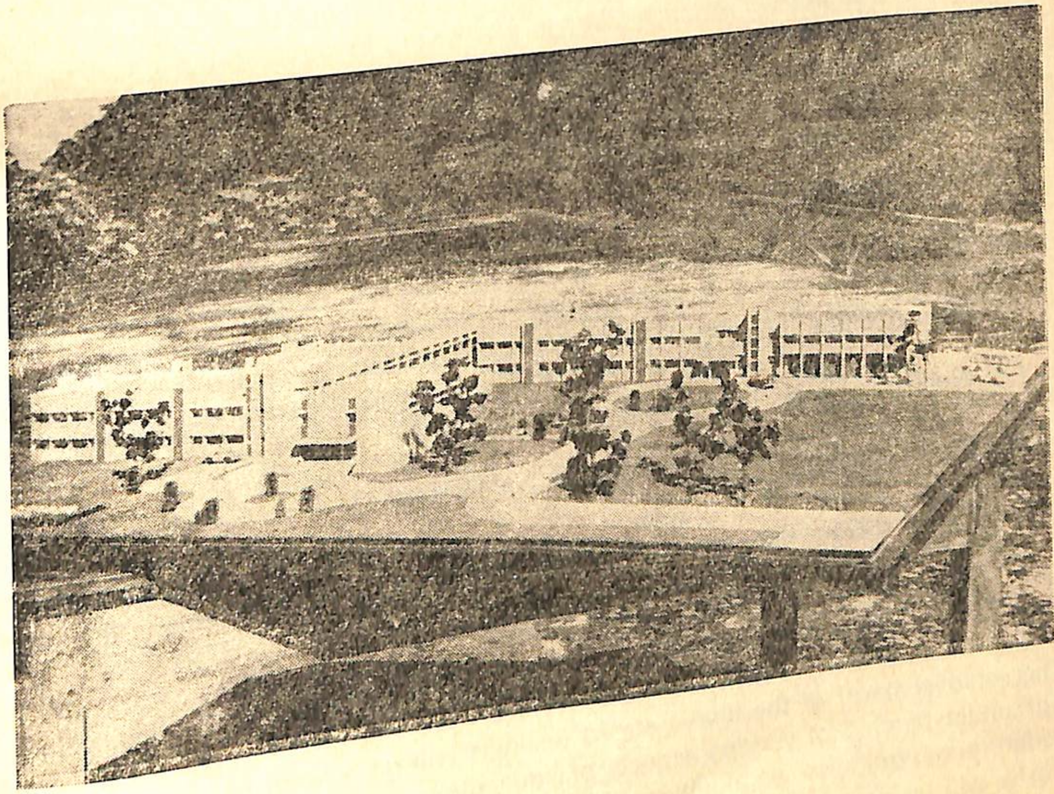
16. Yet another film on "Composite Fish Culture" based on the technology developed at the Fresh-water Fish Culture Division, Cuttack, was considered of equal merit at the Kyoto Conference, Japan.

The scientific contributions of the Fresh-water Fish Culture Divisions, were made at Cuttack under very limited filed facilities, viz., a small improvised fish farm having less than 50 experimental ponds, kindly placed at the disposal of the Central Inland Fisheries Research Institute by the Fisheries Department of the Government of Orissa. This is as against the requirement of 800 experimental ponds of different sizes for the Division. This limitation of basic filed facility of developmental research in fresh-water aquaculture will be rectified at the new farm. The proposed Fresh-water Auaculture Research and Training Centre at Dhauli will have the following facilities:

1. About 800 well-designed experimental nursery, rearing, and stocking fish ponds of different sizes provided with inlets and outlets, fish feeding facilities, a field laboratory, hatchery, and other ancillary structures for fish farming, recycling of waste matter, frog culture, prawn culture, crop-cum-livestock-cum-fish culture, etc.



MASTER PLAN
The fresh water Culture Research & Training Centre, C. I. F. R. I., Dhauli, Orissa



2. The Research Division will have the following sections:—

(*a*) Fish Culture;

(*b*) Fish Reproduction and Breeding;

(*c*) Genetics and Hybridization;

(*d*) Exotic Fish;

(*e*) Aqua and Soil Chemistry;

(*f*) Weed Control;

(*g*) Fish Farm Engineering;

(*h*) Statistics and Economics;

(*i*) Fish Pathology;

(*j*) Sewage Utilization;

(*k*) Prawn Culture;

(*l*) Air-breathing Fish Culture,

(*m*) Frog Culture;

(*n*) Biochemistry;

(*o*) Fish Nutrition;

(*p*) Fish Physiology;

(*q*) Microbiology;

(*r*) Radio-isotope and Radiation Biology;

(*s*) Workshop and Instrumentation; and

(*t*) Documentation.

3. A Krishi Vigyan Kendra for training fish farmers in fresh-water fish culture techniques;

4. A Trainers' Training Centre for training the trainees in fish culture techniques.

The establishment of the above-stated facilities will go a long way to help acquire a thorough understanding of various aspects of aquaculture research and development which are needed for assigning to aquaculture a nation-building status it merits under its own right and Orissa will be proud of it.

* * *

# BREEDING OF IMPROVED RICE VARIETIES FOR INCREASED PRODUCTION IN ORISSA

Dr. H. K. MOHANTY

Agriculture in Orissa, to a considerable extent means growing rice which occupies more than 70 per cent of the total cropped area of the State. Orissa is also unique in possessing enormous varietal diversity in rice particularly in the Koraput-Kalahandi tract and this led scientists to consider the State as one of the ancient centres of domestication of this important food crop of the world. Antiquity of rice in Orissa is also evident from involvement of rice with our age-old religious rites and festivals. Social festivals such as *akhaya trutiya rajasankrati, gambha purnima, garbhana sankrati, laxmipuja* synchronise with various cultural operations of rice cultivations and in a way serve as a crop calendar for the rice-farmers.

Paradoxically rice yield is one of the lowest in Orissa, the land of its original home. It is becoming the major concern of the planners as well as the scientist in active research that rice yield remained low despite considerable improvement in production technology including evolution of high yielding varieties through research efforts in recent years (Table 1). This calls for re-examination of problems of rice cultivation in totality.

**Table 1**

*Area and production of rice in Orissa during the period* 1969—76

| Year (1) | | Area 1000 ha (2) | Production 1000. (3) | Yield/ha quintal (4) |
|---|---|---|---|---|
| 1969-70 | .. | 4406 | 4249 | 9.0 |
| 1970-71 | .. | 4471 | 4341 | 9.2 |
| 1971-72 | .. | 4646 | 3620 | 7.8 |
| 1972-73 | .. | 4476 | 3983 | 8.9 |
| 1973-74 | .. | 4730 | 4400 | 9.3 |
| 1974-75 | .. | 4432 | 3166 | 7.1 |
| 1975-76 | .. | 4684 | 4532 | 9.7 |

Basically increased crop productivity could be brought about through use of suitable varieties in conjunction with improved cultural practices. However, effectiveness of the above two basic factors of production depends upon existence of appropriate supporting services ensuring transfer of technology, input supply, incentive through economic return to the producers.

It is intended to examine here the problems and prospectus of breeding of improved rice varieties in increasing rice production. Primary objective in any crop breeding programme is to develop ideal plant type possessing desirable combination of characters for adaptation to the ecosystems under which the crop is grown and for high and stable yield both quantitatively and qualitatively.

## CROP ECOSYSTEM

In formulating an effective rice breeding programme it is essential to have a thorough understanding of the ecosystems under which rice is grown in the state. An ecosystem is constituted of complexity of factors like climate particularly rainfall and solar radiation, soil, biotic and agronomical practices including cropping pattern.

### Rainfall

The State has total annual rainfall of about 1,400 mm; but is it not so much the total rainfall as its distribution which determines productivity of the rice crop. More than 75 per cent of the total precipitation occurs during mid-June to mid-September and there is great variation in onset of monsoon and its cessation. Another important factor in rainfall distribution is occurrence of breaks causing diminuation of rainfall over a large areas during the season. Break periods of duration longer than a week may lead to drought situation in uplands. Hence breeding objectives should be oriented towards adjusting the growth rythm of the variety to fit to the precipitation pattern.

### Solar radiation

Both sunshine hours and intensity of solar radiation get reduced during monsoon season, particularly during July-August. Critical studies on the role of sunlight showed that 21 days before and 21 days after flowering was critical sunlight requiring period for the rice crop. Hence there is need for developing varieties possessing high photosynthetic efficiency under low sunlight conditions.

### Soil

Soil constitute the most important factor of the ecosystem. On the basis of topography and water regime, the rice lands of the State are divided into three broad categories: uplands, medium lands and low lands which consitute about 17 per cent, 48 per cent and 35 per cent of the total rice area respectively.

### Irrigated rice lands

Approximately 24 per cent of rice land is irrigated; however, only 1/3 of this irrigated area is capable of growing a dry season or rabi crop. These lands are usually double cropped with kharif rice followed by summer rice or other rabi crops like potato, wheat or a oil-seed crop. Summer rice area is about 5 lac hectares and more than 85 per cent of this area is under high yielding varieties. Photoinsensitive varieties of about 120 days maturity period with tolerance to stem borer should be bred for these lands. The irrigated rice lands frequently experience flood and drainage problems in kharif and rice crop suffers heavy loss from gallmidge infestation.

## Rainfed uplands

The uplands due to their topography and porosity of soil do not permit effective impounding of rain water even for a period as short as 2-3 days. The crop is direct seeded under dry conditions. The major problems of upland rices are unpredicable drouhgt spell, severe weed competition, deficiency or non-availability of plant nutrients like nitrogen, iron phosphorous, silica and toxicity due to aluminium and manganese. The upland rice may suffer from diseases like helminthosporium, blast, bacterial leaf blight and leaf streak. Photo-insensitive varieties of less than 100 days maturity with early seedling vigour are to be grown in these lands. Breeding efforts should be directed for developing varieties tolerant to above mentioned adverse factors. When an upland rice crop is harvested it is often exposed to rain; seed dormancy under such conditions is a distinct advantage.

## Rainfed medium lands

These lands are bunded and may have standing water up to 30 cm. during rainy season. These lands retain moisture for perhaps 2 to 3 weeks after cessation of rain. Photosensitive varieties of maturity duration 140—150 days are usually grown in these lands either by direct seeding or transplanting. The photosensitive varieties are induced to flowering in response to shortning day length after mid October and thus suffer from poor grain filling due to increasingly severe moisture stress. Hence drastic shift to varieties of earlier maturity is suggested for these lands.

## Rainfed low lands

These are shallow to deep stagnant water areas with water depth remaining at 30—60 cm. in shallow low lands and water depth goes beyond 90 cm in deep-low-lands. The low lands may retain moisture until November to December. Photosensitive varieties of more than 150 days maturity are usually grown by direct seeding with the onset of monsoon. These lands particularly deep low lands are flood-prone and suffer from intermittent submergence. Plant growth is adversely affected due to water-logging conditions and concomittant soil-problems like iron toxicity, toxicity of acid-sulfate soils, zinc and phosphorous deficiencies.

Both medium and low land rices face severe diseases and insect pest problems like stem rot, blast, gallmidge and green leaf hoppers.

## BREEDING FOR IDEAL PLANT TYPE

An ideal plant type should be efficient enough as a field crop population, in utilizing solar radiation and available nutrients to give high economic yield. The presently cultivated rice varieties belong to two distinct plant types:—

## Traditional talls

These varieties possess tall weak stems, long droopy light green leaves, low to moderate tillering with poor panicle features. More than 90 per cent of the kharif rice area are under these varieties. The tall varieties posses high adaptability and give stable, although low yield. The low yield is primarily due to their, susceptability to lodging, poor penetrance of sunlight into crop canopy due to high leapy growth causing mutual shedding. Thus the talls are not responsive to increased fertilization.

## Modern semi-dwarfs (HYV)

These possess short stiff straw, short erect and deep green leaves. Thus the semi-dwarfs show resistance to lodging and suffer less from mutual shedding. As a result they are more effective in the utilization photosynthetic area for dry matter production and respond better to high fertility conditions.

However, the semi-dwarf varieties so far developed have not exhibited desirable level of adaptability and required level of tolerance to diseases and insect pests.

On the basis of the result so far achieved the following inferences are made: (1) The semi-dwarfs are the ideal plant types for summer rice grown during January—May under irrigated conditions; (2) They can be successfully grown in rainfed medium lands in the kharif season; however breeding programme should be intensified to produce semi-dwarf varieties of 120—130 days maturity duration possessing high yield and resistance to gallmidge, blast and bacterial leaf blight. (3) As the yield potential of rainfed uplands is low, the semi-dwarfs would not have any significant yield advantage over the traditional talls. Further the former have low competitive ability against weed growth and low level of tolerance to drought. Ideal plant types for these lands would be early varieties of intermediate plant height with panicles having large number of short or medium bold grains. However, semi-dwarf varieties of maturity duration less than 100 days may be bred for the medium uplands having relatively finer textured soil with better moisture retention capacity. (4) The semi-dwarfs are not suitable for deep low lands as these varieties cannot stand high water depth, periodic submergence and also practice of "beushauning" usually followed in the low land. Hence breeding efforts should be directed in developing photosensitive, intermediate plant height (less than 125 cm.) varieties with stiff straw, moderate tillering and dense panicles.

## Grain yield and quality

Grain yield is ultimately determined by number of grains per unit area and weight of individual grains. The latter is more or less fixed for a variety. On the other hand grain number if determined by number of panicles per unit area and number of grains per panicle.

Ridge and furrow cultivation for slopy land. Blackgram is on the ridges and rice in the furrows.

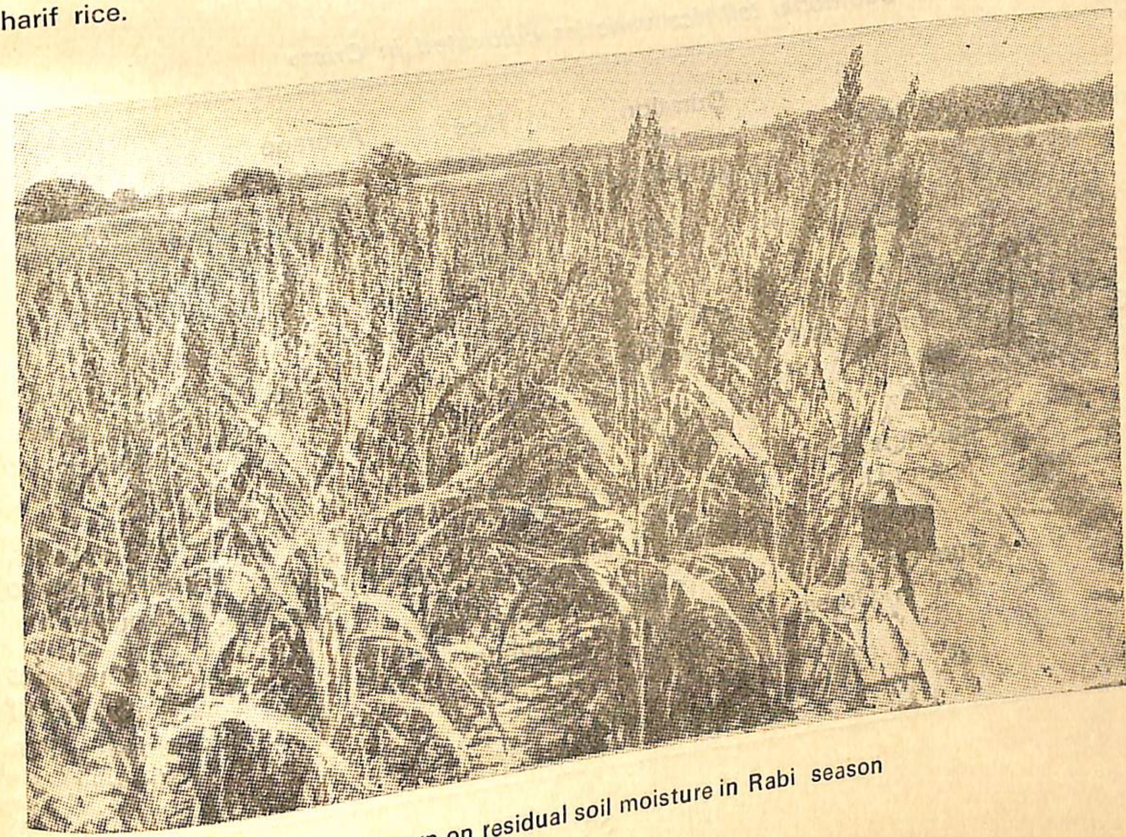
As panicle number and grain number usually show inverse relationship and the former is more susceptible to environmental changes, breeder should aim at evolving varieties of "panicle weight" type.

Like grain yield grain quality is a highly complex trait and so far no dependable and quick methods are available for assessing different aspects of grain quality. Varieties have to be bred for high milling recovery, good cooking and eating qualities. Breeders have to develop varieties with different grain size categories such as coarse, fine and superfine to meet varied consumers need and also varieties with scent and aroma for table purposes and this may meet demands in the export market.

There is now a greater awareness for improving nutritive value of cereals particularly in respect of quantity and quality of proteins. It may be mentioned that rice protein with its higher lysine content is qaulitatively superior to that in wheat and maize. But protein content in milled rice of presently cultivated varieties is less than 7 per cent against more than 12 per cent in wheat and maize. It is intended to breed rice varieties with about 10 per cent protein content in milled rices to enahnce protein consumption of our people most of whom are too poor to afford high priced animal protein. However, breeder has to achieve increased protein content without impairing the cooking. quality.

## Resistance to adverse conditions

Breeding of varieties resistant to adverse environmental conditions including diseases and insect pests is the most important objective of rice improvement programme. This aspect is indicated under ecosystem. There is now pressing demand for incorporation of resistance to gallmidge, bacterial leaf blight and blast into semi-dwarf rice varieties for kharif rice.



Jowar grown on residual soil moisture in Rabi season

## Traditional talls

Systematic rice breeding work in Orissa was carried out during 1937—44 under a rice research scheme financied by ICAR. Then the work was done at the Rice Research Station at Cuttack and at the two sub-stations at Berhampur and Jeypore. During this period more than 50 different strains have been developed by pure line selection from among the most popular local varieties cultivated in different agro-climatic regions of the State, and one variety (BAM 11) was evolved by hybridisation. Some of these varieties like J1, J10, T1242, Bam 6, T141, SR 26 B and FR 43B are still popular with the cultivators of State and the last three gained popularity in the other rice growing states of the country and also at the international level.

With transfer of the State Agricultural Farm at Cuttack to CRRI in 1946, the main Rice Research Station was shifted to Bhubaneswar in 1949 and since 1963 the station is functioning under the Orissa University of Agriculture and Technology. A regional research station at Chiplima started functioning under the University since 1968.

Japonica-indica hybridisation breeding programme was taken up during the Fifties and among the cultures developed out of the programme mention may be made of FH 60-124 which has gained popularity with the cultivators of Ganjam as a low land variety. Among the rice varieties developed at CRRI, the late variety CR 1014 is being cultivated in a sizeable area as a low land crop.

During the period up to 1965 a number of successful introductions have been made into the State and these are N 136 and N 22 from UP; Ptb10 from Kerala and Adt 27 from Tamil Nadu.

**Table 2**

*Popular traditional tall rice varieties cultivated in Orissa*

| Variety (1) | Origin (2) | Duration in day (3) | Rice quality (4) | Average yield (t/ha) (5) | Remarks (6) |
|---|---|---|---|---|---|
| Ptb 10 | A pure line selection in Kerala. | 100 | Coarsed | 1·5 | For uplands, resistant to blast. |
| N 22 | A pure line selection in U. P. | 90 | Coarse white | 1·5 | For uplands, resistant to drought. |
| J 1 | A pure line selection in Orissa. | 105 | Superfine white | 1·0 | For uplands and hill slopes in Koraput. |

| Variety<br>(1) | Origin<br>(2) | Duration in days<br>(5) | Rice quality<br>(4) | Average yield (t./ha.)<br>(5) | Remarks<br>(6) |
|---|---|---|---|---|---|
| Mtu 15 | By hybridisation in A. P. | 125 | Coarse white. | 2·0 | For medium uplands grown both in Kharif and Rabi. |
| J 10 | A pure line selection in Orissa. | 135 | Coarse white | 2·5 | Medium lands in Koraput. |
| T 141 | A pure line selection in Orissa. | 150 | Fine white | 3·0 | Medium low land; high adaptability. |
| T 90 | A pure line selection in Orissa. | 160 | Superfine white. | 2·5 | Medium low land. |
| BAM 6 | A pure line selection in Orissa. | 160 | Fine white | 3·0 | Medium low land, |
| T1242 | A pure line selection in Orissa.. | 165 | Medium coarse white. | 3·0 | Low land |
| FH60-124 | By hybridisation in Orissa. | 165 | Fine white | 3·0 | Low land |
| CR1014 | By hybridisation at CRRI . | 165 | Superfine white. | 3·0 | Low land lodging resistant. |
| SR26B | A pure line selection in Orissa. | 150 | Long coarse white. | 2·5 | For saline lands. |
| FR43B | A pure line selection in Orissa. | 160 | Coarse red | 2·0 | Resistant to flood. |

SALIENT FEATURES OF SOME OF THE POPULAR TALL VARIETIES
ARE GIVEN IN TABLE 2

**Semidwarfs (HYV) :**

As many as 25 different high yielding varieties have been recommended for commercial cultivation. Salient features or some of them are given in Table 3.

Breeding for high yielding rice varieties in Orissa, in fact, dates back to 1956 when a mutation breeding project was initiated to induce and isolate mutant strains possessing high-yield potential, from the popular tall variety, T 141. The project yielded a semidwarf photo-sensitive strain, BBS 873 which was released under the popular name "Jagannath" for medium-low lands.

Hybridisation breeding project for incorporating Dee-goe-woo-gen dwarf gone into the genetic background of the local improved varieties, was initiated at OUAT in 1967. At the initial stage of the programme the objective was to develop short-height varieties possessing high yield and yield stability. The programme led to successful release of three promising selections for commercial planting in 1971 under the popular names, Kumar, Hema and Rajeswari. In the next phase of the work emphasis has been given on breeding for early maturity strains for uplands and two selections, OR 34-16 and OR 45-61-23 maturing in about 90 days were released in 1976 under the names Parijata and Suphala respectively; these, infact, have gained acceptance of the cultivators of the State prior to their release.

**Table 3**

*Popular high yielding varieties cultivated in Orissa*

| Variety (1) | Parentage (2) | Duration in Kharif (days) (3) | Rice quality (4) | Average yield t./ha. (5) | Remarks (6) |
|---|---|---|---|---|---|
| **Annapurna** (Cul.28) | Ptb 10 X TN1 | 100 | Coarse white | 4·0 | Grown both in Kharif and Rabi, for uplands. |
| Parijata (OR34-16) | T (N) 1 XTKM6 | 90 | Fine, white | 4·0 | Grown both in kharif and rabi, for uplands. |
| Suphala (OR45-61-23) | T (N) 1 X T 141 | 90 | Superfine white | 3·5 | Sutable for rabi and kharif; for upland; good cooking quality. |

| Variety | Parantage | Duration in Kharif (days) | Rice quality | Average yield t./ha. | Remarks |
|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) |
| Ratna (CR44-11) .. | TKM6 X IR8 | 120 | Superfine white | 4·5 | Both for rabi and kharif; medium lands. |
| Kumar (OR10-112) .. | T90 X IR8 | 125 | Fine white | 4·5 | For rabi and kharif; medium lands. |
| Hema (OR5-11) .. | T 141 X IR8-246 | 130 | Coarse white | 5·0 | For rabi and kharif; medium lands. |
| Rajeswari (OR10-193) | T90 X IR8 | 135 | Coarse white | 5·0 | Grown in rabi and Kharif medium lands. |
| Jaya (IET723) .. | T (N) 1 X T 141 | 135 | Coarse white | 5·0 | For rabi and kharif; medium lands. |
| Sakti (CR93-4-2) .. | (Ptb21 X Ptb-18) X IR8 | 135 | Coarse white | 4·0 | For kharif; resistant to gall-midge. |
| Vikram (RPW6-13) .. | IR8 X Siam29 | 140 | Coarse fine | 5·0 | For kharif only, resistance to gallmidge. |
| Jagannath (BB8873) | T 141 mutant | 155 | Fine white | 5·0 | For kharif only, medium low land. |
| Pankaj (IR5-114) .. | Peta X Tonkai Rotan | 155 | Coarse fine | 5·0 | For kharif only, medium low land; intermediate height. |
| Mahswari .. | T65 X Mayang Ebd 80/2 | 145 | Coarse fine | 4·5 | For kharif only, medium low-land; intermediate height. |

During the period a number of promising selections developed at CRRI, AICRIP or other states were also released for commercial planting on the basis of their performances in the all-India trials as well as trials in the state. Among these special mention may be made of Annapurna from Kerla; Bala, Kalinga I and II, Ratna and Sakti from CRRI; Jaya, and Vikram from AICRIP. Further it may be mentioned that on the basis of large scale trials conducted by OUAT, Mahsuri, a intermediate height, moderate lodging resistant selection developed in Malaysia, was recommended for cultivation in 1976.

In recent years the rice breeding work is programmed to intensity breeding research on (1) Gallmidge resistance, (2) adaptation to upland and low land conditions (3) suitability for saline lands. A number of selections, like OR 79-11, OR 78-19. OR 127-1, OR 132-3-1 combining high level of resistance to the pest and high yield merit immediate release.

**Future outlook :**

As indicated above hybridisation followed by selection in the segregating population, is still the commonly adopted breeding method for improving self-fertilizing crops like rice. The breeding procedure involves genetic manipulation to develop varieties combining desirable traits presents in two or more different parents. The success of this programme very much depends upon identification of germplasm or parental materials possessing the sought-for characters. Hence the necessity of collection preservation and evaluation of indigenous rice germplasm which faces extension due to increasing adoption of modern high yielding varieties.

Similarly for effective implementation of variety improvement programme it is imperative to strengthen the existing breeding institutions and establish such institutations in different agro-climatic zones. This will facilitiate location-specific breeding research and multi-location testing to assess varietal adaptability.

Breeding of an improved variety consumes good amount of money, time and technical labour; hence the procedures involved in the formal release of the varieties and seed multiplication and its distribution should be re-examined so that the farmers could get the benefit of research speedily.

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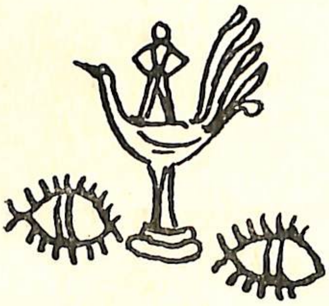

# Horticulture in Tribal Areas of Orissa

Dr. R. C. DAS

The tribals of the State of Orissa comprise of about 40 per cent of the total population of 2·5 million people. Orissa having an area of 1,54,000 square kilometers consisting of coastal tract,control Table land, Northern Platen and Eastern Ghat having varying topography, soil and Agro-climatic conditions, registers about 40 per cent of the area under hills and forest in which most of the tribals live. These are the people who are simple, brave and nature levers. Among their food habits they mostly depend upon fruits, vegetables, roots, leaves, mushroom, millets, forest birds and animals. Some of them know some plants in the forests and jungles which they use as medicine for curing some of the ailments in their own way. With the advancement of modern civilization, even though some changes in the tribal life are noticed, yet they remained poor since the hills, lands, plant wealth and water sources have not yet been utilised properly and on the other hand they have been exploited by the socalled civilised people of the plains. Fifth Five-Year Development Plans has so far being completed. The *per capita* expenditure in the state development is very low and it is still poor for the hill area development as far as development of Horticulture is concerned. There is no doubt that most of our hilly tracts and forest areas are rich in plants of economic importance. Hence, proper planning of utilizing them under the environment available in the different tribal areas is the first present need. For any kind of agricultural or Horticultural development three basic approaches are required. Extension, Research and Training.

## I. EXTENSION

All the hills are not under the same macro and micro environments. The Eastern side of a hill is climatically quite different from the western side. All hills do not have the same elevation and conditions also differ greatly at different topography of the same hill. Thus while planning the hill development programme for growing crops, proper steps should be taken to select the location and to follow suitable cropping schemes and package of practices. As per the estimate of the Horticultural Directorate, Orissa, there are about 1·2 lakhs hectares of area under fruit crops at the end of the 5th Five-year Plan period and about 3·0 lakh hectares is to be covered up by the end of the 6th Plan period. This includes the tribal areas also. In the case of vegetable and potato, about 4 lakh hectares under different vegetables are being grown, out of which potato occupies 7,000 hectares only. In the hills, during kharif, potato and some vegetables like tomato, beans, etc., are also cropped successfully in addition to the Rabi season. Turmeric, ginger, arroroots, Tapioca, etc., are grown in certain hilly tracts of the State. Coffee, Cashewnut, hill bananas, Pineapple, Mango, Jack fruit, etc., are also growing successfully in the hills.

The development or extension programme in Horticulture in the tribal areas need careful and well planned approach. These may be done as indicated below:—

(1) Planning in Government fallow land, planning in the tribal village sorroundings, planning in individual tribal land and around his home.

(2) Selection of species and varieties of horticultural plants suitable to a particular locality or area taking the soils, macro and micro climatic conditions, topography and availability of water during the year.

(3) Involving the tribal people intimately with the developmental programme.

(4) Demonstration farms growing fruit trees, Vegetables, spices, plantation crops, medicinal plants, plants for fuel, etc.

(5) Cropping pattern under area basis and proper package of practice of raising crops.

(6) Supply of good and suitable materials (plants, seeds Ferty, Pesticides, etc).

(7) Facilities for quicker disposal of the Production with reasonable price.

(8) Elemination of "PODU" Cultivation.

## II. RESEARCH

For any Agricultural or Horticultural development research informations are one of the most important requirements which greatly help to make any programme a success. At present very few research centres are working in the tribal areas of the State with all kinds of draw backs. (Scanty budget, unavailable of suitable trained personals, lack of normal facilities available for the workers in the hills, etc). Pottangi, Kothgarh and Similiguda are the only centres in the hills where some work on Horticultural crops have been taken up recently. Other hilly areas of the State have not yet been taken up for research work in Horticulture. Survey, collection, assessment and selection of Horticultural species available in each tribal centre are to be taken up. Introduction of suitable plant species in different tribal areas is to be done. Formulation of suitable package of practice of each crop to be grown commercially and in the home garden is to be evolved. Cropping pattern for each area is to be developed.

Besides the various problems faced in the tribal areas with plants are to be tackled. For example fruit drop in mangoes, fruit borer, die-back- shortly mould in mango and other fruits, termite troubles in the hilly tracts, nutrition availability and crop production, diseases and insect menace, Soil erosion from orchards and gardens, weed control, water management, soil conservation practices, etc.

The research done on some crops in the tribal areas have indicated some good information. The experiments on potato, pepper, cardmom., Tapioca, Ginger, Turmeric, pineapple, etc,, has indicated the possibilities of cultivation of these crops and many other horticultural crops profitably which will help the tribal to improve his conditions. There are wider scope of growing fruits like mango, citrus, banana, jack fruits, arrowroot, varieties of vegetables, medicinal plants, ornamental plants and even some low chilling temperate fruits. Seed production of vegetables and ornamental annuals in these areas will be a very successful business. Production of grafts and other plants would help greatly to get good income by selling them in the plains and other areas.

## III. TRAINING

Extension and research work require well trained personals. To work in the tribal areas, hard, sincere, well behaved, healthy, devoted well informed and experienced field workers in the field of Horticulture is needed. In most of the tribal areas more of Horticultural development is needed with less of agronomical expansion. Tribals prefer to eat millets rather than to rice. The land suitable may grow rice, millets and pulses. Other lands can be well utilized for growing fruit; vegetables, root and tuber crops, forest plants specially suitable for fuel, medicinal plants, spices, etc. Hence, training of the tribals in Horticulture is needed for successful development. This may be done in two ways—

(1) Establishment of a College of Horticulture specially in the hilly tract having good water supply, electricity and land. Since many intermediate science colleges have come up in many hilly tracts of the State, the students passing intermediate in science of those areas be trained at least up to the technical graduate level. Fifty per cent of the seats should go to the students of tribal tracts and the rest for the students of the plains. This would help greatly to train up the people of the tribal areas, who will do a better job than people going and working there from plains. The Agricultural University can open a college for Horticulture in the hills for encouraging the tribal boys to train them in Horticulture.

(2) *Short courses*—Short training programme in Horticulture (propagation, method of cultivation, plant protection, preservation, etc.) can be given to tribal people and others which would help greatly to develop Horticulture in the State of Orissa where the Horticultural Potentialities have not been utilized so far. The establishment of a Horticultural, Directorate by the Government of Orissa would go a long way to make the State richer.

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| 33 K. V. Line | .. | 886 K.Ms. |
| 11 K. V. Line | .. | 11,081 K.Ms. |
| L. T. Lines | .. | 9,070 K.Ms. |
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| * Number of Consumers by the end of 1976-77 | .. | 3,00,000 (Approx.) |
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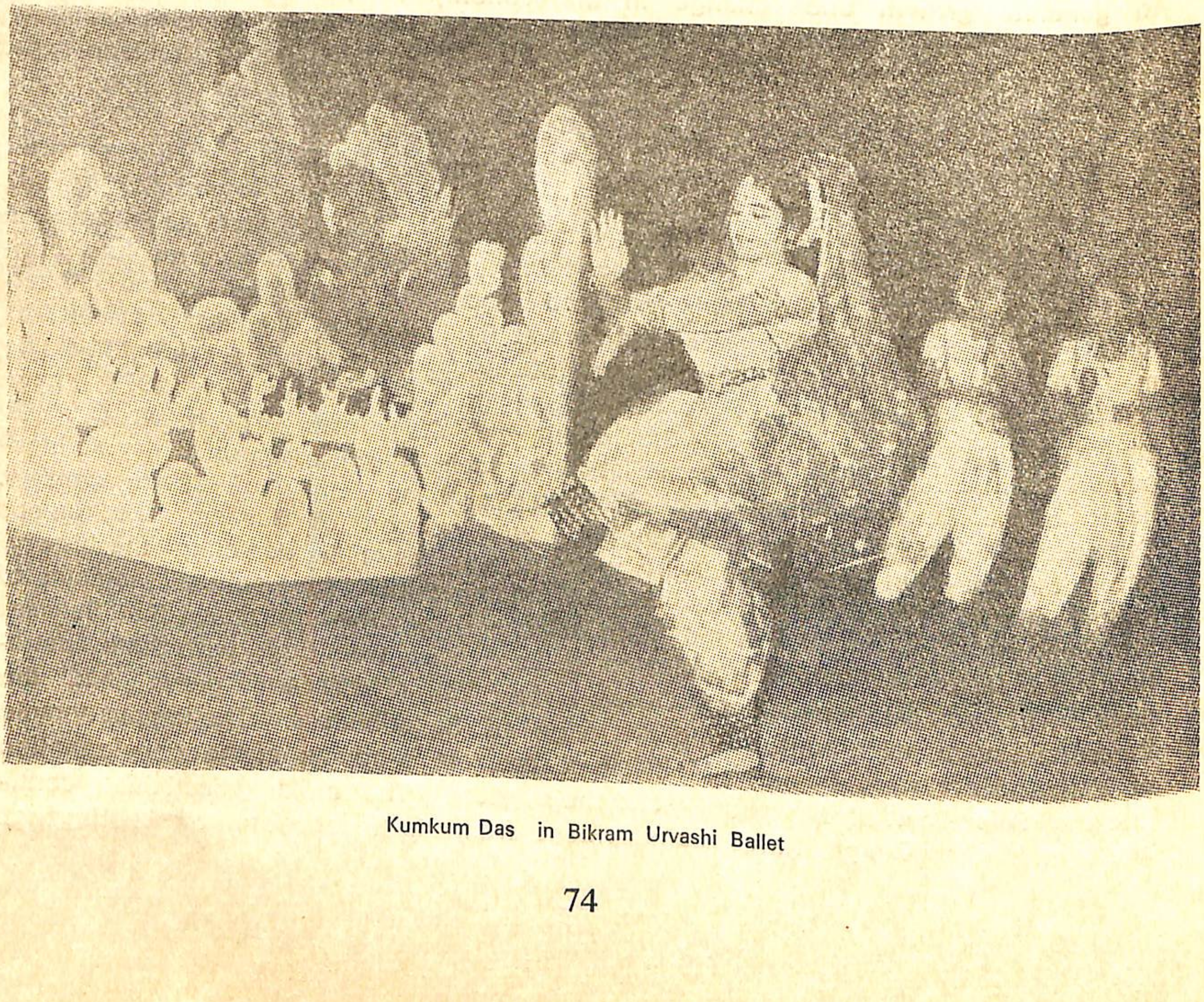
# Cultural Heritage of Orissa

Dr. A. JOSHI

Orissa is rich in its cultural heritage. This ancient land is dotted with temples and shrines, Buddhist Stupa and monuments, Jaina Caves and sites. It covers an area 60,135 sq. miles with a population of 22 millions. It is enermously rich in forest and mineral wealth, lofty mountains, perennial rivers and fertile coast add to its beauty and wealth. It is a State rich in natural resources and the post-Independence projects like Hirakud Dam, Machhkund, Hydro-electric Project, Talcher Thermal, Paradeep Port and the Steel Plant at Rourkela are all designed to generate growth and change in the economy of the State. Bhubaneswar, the capital of Orissa is an ancient seat of culture studded with temples, protected tanks and historic caves. The temple of Lingaraj demonates its landscape. One of the earliest historical charter on rock is found at Dhauli, 8 Kms. from Bhubaneswar. It consists of eleven rock edicts of Asoka-Maurya (272—236 B. C.) and two special Kalinga edicts recording the count orders of the emperor to his Mahamatras of Tosali and Samapa to look to the well-being of the Kalinga people. Above these inscriptions is the front part of an elephant sculptured in rock symbolising Buddha. It is believed that at this place, Asoka, a resolute conquerer laid down his arms and embraced Buddhism. Here he became Dharmasoka and accepted nonviolence and love as the means of conquest of hearts of men. Tosali, referred to in the special Kalinga edicts has been identified by scholars with Sisupalgarh. Recent Archaeological excavations in 1971 have yielded antiquities belonging to 3rd century B. C. to 4th century A. D. Of course more reliable evidence is available to identify Sisupalgarh with Kalinganagar of the Emperor Kharvela of Mahameghavahana family of Chedi dynasty. During the reign of Emperor Kharvela, a great patron of Jainism, the famous caves of Udayagiri and Khandagiri were cut into the hills depicting the history, culture and contemporary art tradition of Kalingadesa. The cultural remains of 6th century A. D. mostly in the form of art and architecture reveal that Saivism flourished faster and temples dedicated to Lord Siva were built with State patronage. The earliest temples of Orissa, the Satrughanesvara group and the Parasuramesvara were built during the reign of Sailodbhavas. The famous temple of Vaital, Sisiresvara, Rajarani, Muktesvara, etc., are products of the transformation into the Saiva cult of the people and their rulers. The building activities continued under the Ganga Kings as is evident from the inscriptions of Chodaganga

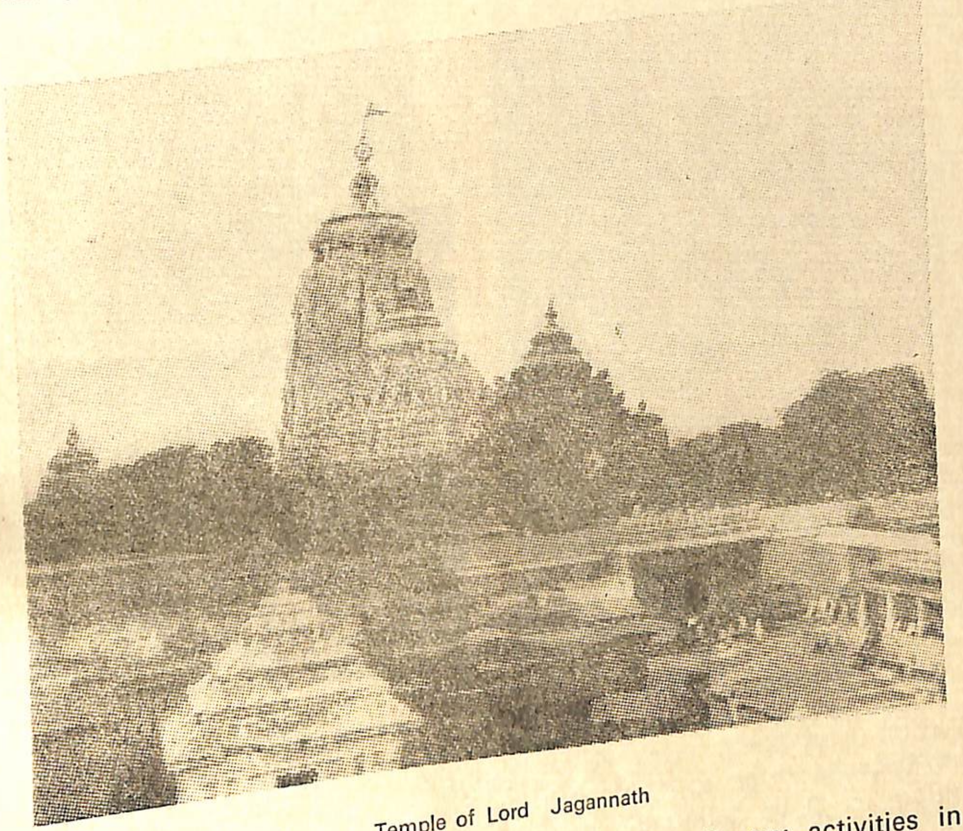
(1078—1147 A. D.) Meghesvar was built by Svapnesvaradeva and Ananta Vasudeva was constructed in 1278 A. D. by Chandrikadevi during the reign of Bhanudeva, the great Ganga monarch.

Ananta Vasudeva is a shrine dedicated to Lord Vishnu. This shows that Vaishnavism was predominant during the 13th century A. D. at Bhubaneswar so much so that Saivism has to adjust itself with Vaishnavism in many rituals and rites of Lord Lingaraj, now a manifestation of Hara and Hari. Vaishnavism became a popular faith and Puri, the abode of Lord Jagannath became the chief centre of Vaishnavas. Lord Jagannath as the incarnation of Vishnu, was installed in the present temple of 214′ height on Nilachala hillock by Chodaganaga (1078—1147 A. D.). Caste distinction does not exist in this temple and one can partake Mahaprasad from the other. Lord Jagannath is accepted as the lord of Savara tribals, whose descendants till to-day take part in the day to day rituals. Chaitanya saw in the God Jagannath the incarnation of Lord Krishna and preached the eternal gospel of love. Such was the magnetic spell of this devine soul that Gajapati Prataprudradeva, the then Emperor of Orissa, became his deciple and accepted Him as the incarnation of God. Even to-day people remember and respect Lord Chaitanya and recite Chaitanya Charitamruta and Bhagbat every evening. Cultural excellence reached new heights in the architechture of Sun-temple at Konark. Konark as the seat of Sun-worship is known from Kapila Sanhita, Madala Panji, Prachi Mahatma, Bhavisya Purana, Samba--purana, etc. Narasimha — (1) 1255 A. D. constructed this colossal temple. Abdul Fadl, the writer of Ain-i-Akabari of the Akabara's time (1556—1605 A. D.) says that the cost of the temple was met out of twelve years' revenue of the province



Kumkum Das in Bikram Urvashi Ballet

and was a great monument. "Even these whose judgement is critical and who are difficult to please stand astonished at its sight". Sterling (1825), Fergussion (1837) have seen a portion of the main temple standing to a height of 150 ft. The Aruna Stambha of this site now decorates the entrance of Jagannath temple. The Raja of Khurda was removing the stone images till 1838 when Government ordered him to stop (O. H. R. J. Vol. VII, No. I, 1958, P. 59). One of the important panel is the one, where Ziraf, an African animal is seen presented to the king on elephant. This is generally regarded as an evidence of foreign contact of Konark age. In fact Konark was a sea port and from Konark, Polur, Tamralipti traders were going to foreign countries like Java, Sumatra, Borneo, Bali, Indonesia, etc., till late 16th century when pirates forced our traders to stop. Due to this contact a section of people in Indonesia is known as 'Kling' and the cultural and architectural remains of the people of this country from early times have similarity with that of Kalinga.



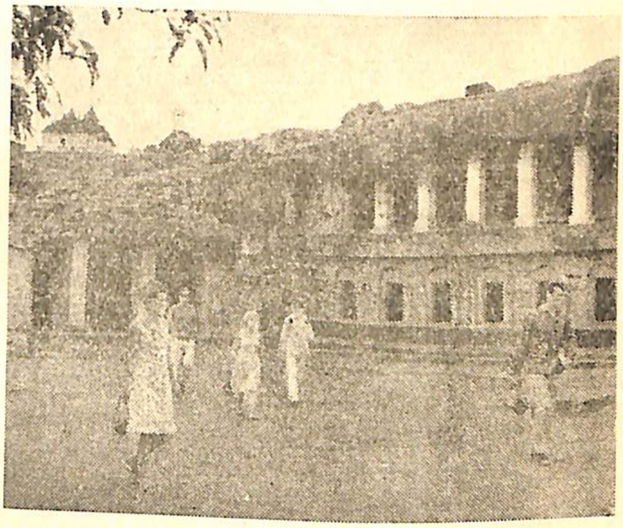
Temple of Lord Jagannath

Orissa is rich in the field of literary culture. The literary activities in Orissa can be traced back to the early historical period on the basis of epigraphic records on Dhauli and Jaugad (3rd century B. C.), Kharvela's inscription at Udayagiri (1st century B. C.), Bhadrakali temple inscription (3rd century A. D.) and Asanapat inscription written in Brahmi script (4th century A. D.) with Sanskrit or Prakrit language. After 4th century A. D. use of Sanskrit verses in copper plate records of Matharas, Eastern Ganga Kings of Kalinga were noticed. The donees of these copper plates were proficient in Vedas, Vedangas, Itihasa, Purana, Nyaya, Smrti Kavya, Alankara, Sangeet, Jyotisha, Ganita, Dharmasastra, etc. These early records give the names of Simha Datta, Purusottama Bhatta, Narayana Satkavi, etc., as famous scholars of Sanskrit.

The less authentic evidences of tradition assigns the notable Sanskrit poet like Vishnu Sarma, writer of Panchatantra, Murari Mishra, Krishna Misra to Kalinga and Utkal country.

Some of the important poets of medieval period are Gobardhana Acharya, the writer of Aryasaptasati and Udayana the first commentator of Jayadeva's Gitagovinda. Traditionally Udayana was a great friend and admirer of poet Jayadeva both coming from prachi-valley. Kaviraja Jayadeva, the famous author of Gitagovinda is of immence popularity for his systematised medlodious writings. The hymns of Jayadeva contributed considerably to the supremacy of Radha Krishna in the State of Orissa. Due to revival of Vaishnavism by Shri Ramanuja Sri Vishnuswami, Sri Numbarka and Shri Madhavacharya, Puri became a great centre of learning and literary activities in the 12th-13th century A. D. towards the end of the Ganga rule in Orissa.

Mukteswar Gate



Rani Cave

All what have been stated so far is on the development of Sanskrit literature in Orissa because prior to thirteenth century A. D. adequate evidence of literary composition in Oriya language are still to be discovered on the evidences on palmleaf manuscripts have been destroyed in the hot climate of the country. The Surya Vansi Gajapati Kings were great patrons of Oriya literature and language and during this period Oriya language was much developed. In the beginning of the Suryavansi rule Koili lyrics like Kesava Koili were written. Kesava Koili is known as the earliest Oriya monologue poem which is also known to be of great philosophical value, written by Markandeya Das. The Chautisa poems also belong to Gajapati rule. Balarama Das's Ramayana, Jagannath Das's Bhagvata, Sarala Das's Mahabharata, Raja Krishna Singh's Mahabharat, Salabega's Songs, Mathura Managala by Bhakta Charan Das, Rasakallola by Dinakrushna Das (1568 A. D.) are some of the early works on Oriya language and literature which are still popular in Orissa.

Upendrabhanja occupies an important position in the literary field of Orissa for his immortan writings of Lavanyavati, Vaidehisa Vilasa and other songs. Followed by the great poet were Rama Das, author of Dadhyata Bhakti, Sadananda Kavi Surya, Abhimanyu Samanta Simhara, writer of Vidagdaha Chintamani, Brajanath Badajena, author of Samarataranga, Baladeva Kavi Surya composer of Kishora Chandranana Champu, Banamali Das and Bhima Bhoi.

Buddha of Ratnagiri

Apsara of Konark Temple

The modern Oriya language and literature has been enriched by poets like Radhanath Ray, who has composed Meghaduta, Chandrabhaga, Nandikesari, Usa, Parvati, Chillika, Shri Madhusudan Rao has contributed many devotional writings like Stava, Sitabanabasa, Jivana Chinta, etc., Satirical and literary writings of Fakir Mohan Senapati have enriched the literary culture of Orissa. Contribution of poets like Gangadhar Meher, Nandakishore Bal, Kuntala Kumari Sabat give general ideas of the characteristics of modern poerty. Of the living writers, Shri Kalindi Charan Panigrahi, Shri Gopinath Mohanty, Shri Kanhu Charan Mohanty. Dr. Mayadhar Mansingh and others have made significant contribution to the development of literary culture of Orissa.

Cultural heritage of Orissa has also been enriched by dance, drama and music. Development of dance, drama and music in Orissa is interesting, as in other parts of India. These arts were practised mainly for religious performances and devotion to God and Goddesses in caves, temples, palaces and cottages. Till recent times temple dancers were attached to shrines in Orissa, who usecd to dance in daily rituals of the deity.

The Hatigumpha inscription of Kharvela refers to entertainment of citizens by music and dance. This is coroborated by various panels of dance and music in the Udayagiri and Khandagiri caves. These are earliest examples of dance and music in Orissa. Dancing figures and panels are noticed in the sculptures and door-ways of Lalitagiri, Ratnagiri and Udayagiri in Cuttack district. To the same period belongs the sixty-four Yoginis in dancing attitudes in Ranipur Jharial, Hirapur and other temples.

Saivism in Orissa has produced a large number of dancing figures. The earliest example is the figure of Nataraj recently acquired from Asanpat in Keonjhar district with an important inscription beloning to Satrubhanja datable to 4th century A. D. In the Satrughanesvara and Parsurameswar group of temples at Bhubaneswara some of the early examples of dancing figures and Nataraj have been carved. The dancing panels in the front side of Parasurameswar are considered as of exceptional merit by art critics as these dancing images are full of vigour and rhythm. These figures reveal the costume, ornaments, pose and style of these period. The next group of female dancers and Natarajas may be located in the Vaital Deu, Sisireswar temple and in the temples at Kealo, Gandharadi, Kosaleswar near Sonepur, Sinhanath at Barambha belonging to Bhaumakara period of Orissa History. Jajati constructed the famous temple of Lingaraj at Bhubaneswar and Kalavati constructed the Brahmeswar temple consisting of beautiful dancing figures and of panels of superb workmanship. The Ganes, Vidyadharas and dancers of the temple of Mukteswar and Rajrani are of similar workmanship. Some of the dancing figures of Ganesa, Nataraj at Khiching may also be classed as excellent piece of art of this period. According to Skanda Purana, Siva Purana, Padma Purana, Matsya Purna etc., dance performances by beautiful damsels in honour of God was essential. According to tradition the system of Devadasi was prevalent till recent times. Prataprudradeva ordered in the form of stone inscription that dance must be performed from Bhog in the evening till bed time of God Jagannath and Geeta Govinda may only be song. The Gopinathpur temple inscription of the time of Kapilendra Deva

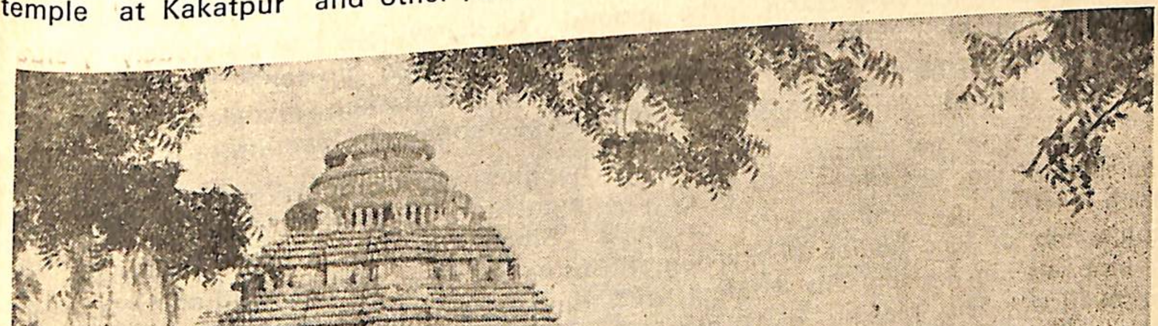
Mather and Child for Brahmeswar Temple

Lingaraj Temple

reveals that the temple had beautiful dancing maidens as charming as Rambha. Madala Panji states that the son of Chodaganga appointed twenty dancing girls for dancing at Jagannath temple.

The temple of Koanark dotted with dancing girls has a dancing hall full of dancing sculptures only. Thousands of dancing and singing images in this great hall of dance gives an idea about the dance and Music of 13th century A. D. On the Jagamohana one life size dancing Bhairavas and maidens with musical instruments decorating the top recesses of this structure.

The temple dancers are known as Maharis who are subdivided as dancers, singers, etc., with male a companists. In the morning the dance takes place at Natmandap which conforms to pure Nritya and at mid-night during Bada Simhara exclusively for the deity with sons of Geeta-Govinda. At present there are a few Mahari dancers at Puri who are still in service at Jagannath temple, Mangala temple at Kakatpur and other places.



Sun Temple Konark

Reference about dance performances are noticed in Ekamrapurana (13th century A. D.). Swamadri Mahadaya, Sarala Mahabharat, Parimalakavya, Dandi Ramayana, Kavi Kalpadruma, Rasakalpadruma, Vishnu Dharmottara Purana and other later Puranas. Odra Nritya has however been referred to in Abhinaya Chandrika (15th century A. D.). Natya Manorama (17th century A. D.), Sangeet Narayana (18th century A. D.), Sangeet Muktavali, Abhinava Darpana Prakasa Sangeet Kumudi, Sangeet Kalpalata, Geeta Prakasha, Sangeet Ratna, etc.

The Department of Cultural Affairs of the State Government are engaged in further studies to trace the history of the people inhabiting this land. Recently an ancient pre-historic site has been traced out inside Jiminia hillock area near the village Sankarjanga under the Subdivision of Angul in the district of Dhenkanal. A person named Somanath Biswal of the village Sankarjanga while moving with the cows near the Jiminia hillock noticed a polished stone inside a hole. He dug a little portion of the mound and took away some stone implements of unparalled type so far discovered in the Neolithic sites of Orissa. Besides, a arge number of copper bangles have been collected by the Subdivisional Officer, Angul.

The State Department of Archaeology conducted exploration work in the vicinity of Jiminia hillock areas and collected three chisels of the size 17·08 C. M. X 3·08 C. M. X 0·8 C. M. and one adze of the Neolithic period. The total number of burial mounds numbering 30 belongs to the primitive people have been found below the hills.

The excavation of this pre-historic site was conducted by the Cultural Affairs Department from the 29th February 1972 till the 20th March 1972. Three small mounds were selected for excavation. The mound No. I., which had previously yielded a large number of stone instruments was first taken up and the result was fruitful. The digging up to one metre depth in this trench revealed two layers of different deposits with fragmentary pieces of bones in section.

The stone implements and copper bangles were proportionately placed by the side of the dead-bodies marked by fragmentary pieces of bones mixed with earth instead of a full skeleton or skulls. Since the site is below the hills, the conjecture of dead-bodies being dug out or eaten away by the wild animals seems appropriate in the present context of finding a fragmentary bones from the excavation. The placing of 10 number of chisels together with copper bangles in trench No. 1 gives a clear picture of the system of burials accompanied by day-to-day used articles of the Neolithic people.

The trench No. 2 produced only one implement of adze type. The trench No. 3 is to some extent similar to trench No. 1, so far as the placing of the stone implements and bangles are concerned. The number of chisels and copper bangles discovered from the trench No. 3 are two and three respectively. The total number of discovered stone implements and copper bangles including surface findings are 14 and 10 respectively.

The excavation of these three trenches exposed the system of burials of the Neolithic people. It is not possible to determine the exact period of the burials on the basis of the present finding since we did not get charcoal, a date-line of determining the actual dates by C. 14 method. Further excavation on the habitation area to be located somewhere near the Jiminia hillock may throw new light on the stone age sequence of Orissa. It may be pointed out that the Archaeological Survey of India conducted excavation in the Neolithic sites at Kuchai and Kuliana on the Budhabalanga river in the district of Mayurbhanj. But the discovery of the Neolithic burials site of the Jiminia hillock areas of the Brahmani valley stands unparalleled to other sites of India.

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Deputy Director, Cutural Affairs
Government of Orissa, Bhubaneswar

# FOLK ART AND CRAFT OF ORISSA

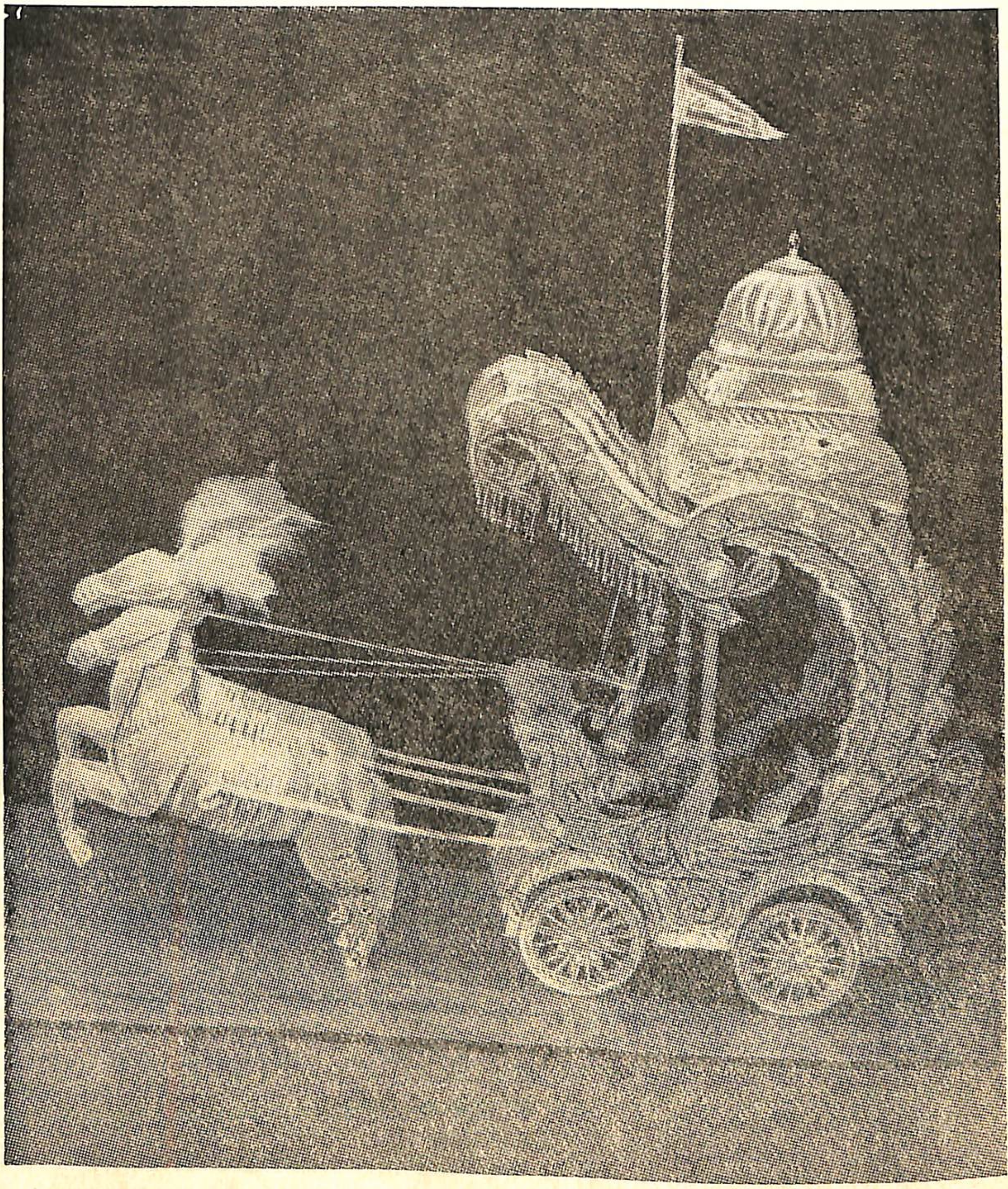
Shri DINANATH PATHY

Evening draws to a close. Darkness deepens over the thatched roofs of a cluster of Orissan hamlets. It is the month of Margasira (Nov./Dec.). The streets get cleared off the hoofed dust of the home-bound cows. The temple bell rings. Children get into the houses. The bride's heart gets overwhelmed with the pentup emotions, her unschooled delicate fingers tickle with a desire to express. She comes out with a cup-full of 'Pithau' (a white paste prepared out of the grinding of rice). Taking out her little fair hand from the overhanging veil she draws 'Jhoti' (Alpana) over the Indian red background over laid on cowdung smeared platform. She draws lotuses, creepers, birds, purnakumbhas, fishes, bullocks, men with plough, Lakshmipada (footprints of the Goddess Lakshmi) bullock carts like a professional painter. On the walls too 'Jhotis' are drawn, a pyramidal form displayed by the subsequent receeding number of dots and over it sprays indicating the paddy bunch. One is but startled at the swift, yet delicate and suggestive lines and the neatness of execution. The old mother knows many more but it is a test for the new comer to the house. Within the doors a notorious grand child springs into the lap of grandma's and starts putting several questions. Each is met with fitting answers from the grandma's or most occasionally the boy gets a story of a witch who had so many heads and hands and who had wings and could fly and whose beautiful daughter wanted to marry the Rajkumar etc. There cannot be reasonings to all this, no historic confirmations to the grandma's conceptions, no anatomical justifications to all the forms drawn in Jhoti, no geometrical exactitude in the circles and squares. These may be highly ultramodern in the sense Picasso's pictures are judged or too old and remote to be called traditional our tradition and culture.

Folk art is the collective aspirations and expressions of people who live in rural areas. It is deeply rooted in the soil and closely associated with popular customs and beliefs. It is not easy to trace the origin and development of the growth of the ageless folk art traditions. The tradition and culture of a society are perfectly mirrored through the beauty, shape and colour of things used in its daily life.

Folk art is more an expression of the heart which needs compassionate attitude to appreciate. These are the semi-pronounced words of an infant which need appreciation. With simple bold forms and elemental colours they captivate the heart of the onlooker. If one has ever marked the scribbings of a child one will be really struck at the renderings of forms with its limited stock of preception. An imagination saturated does not wait for reasoning or logical understanding to take forms. Folk art is a non-classical art and has no rigid formulae which cannot be violated. It has a feeling of intimacy and smell of the soil. It is not purely aimed at Art for Art's sake but caters to the daily need of the household, ceremonial occasions and religious functions.

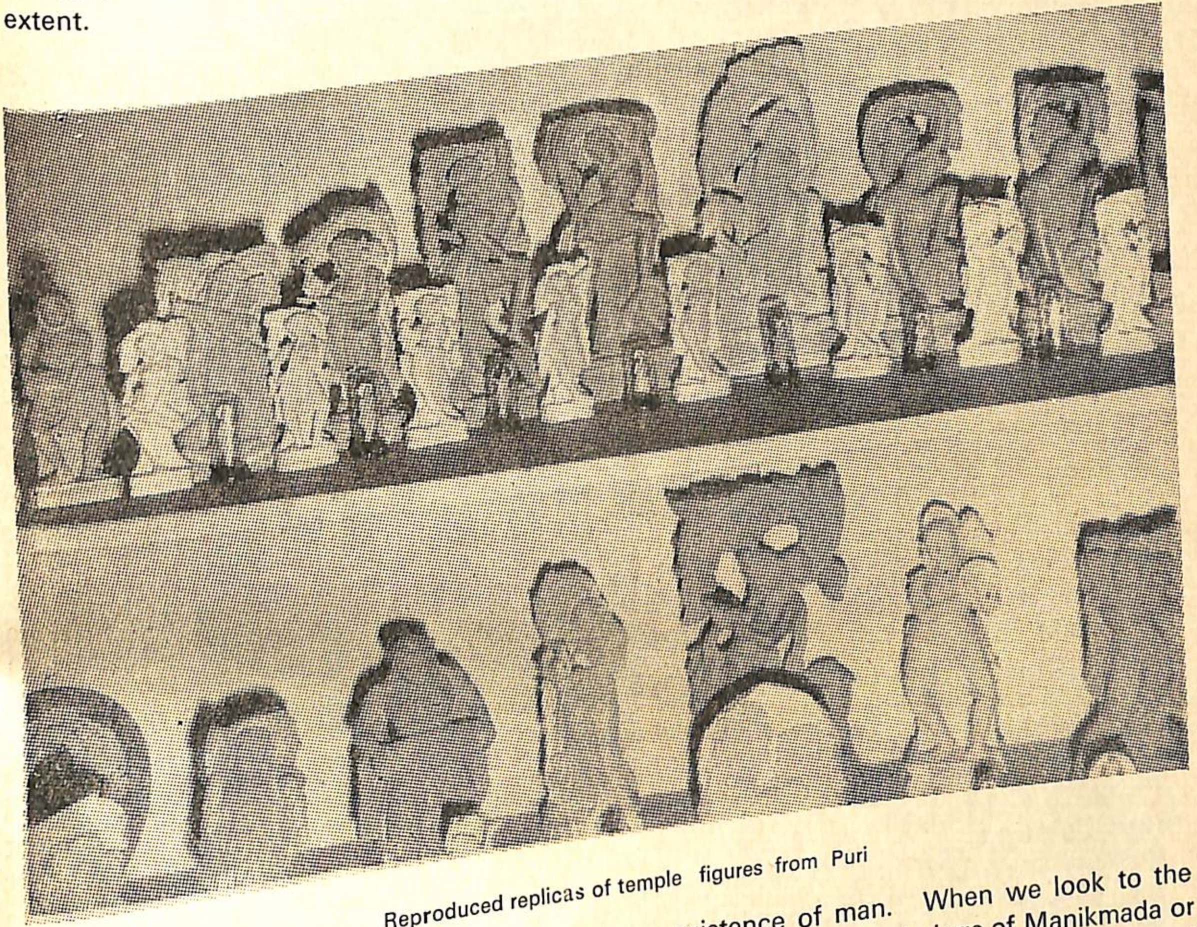
Orissa has a rich variety of folk arts and crafts. The artisans who shape the crafts and who add colour to them are people drawn from the lower strata of the society. The village carpenter who carve the plough, make the bullock cart, the village potter who shape the pot and the village painter who draws on the wall or paints a pata on festive occasions or for ritualistic purposes are the primary folk artists who mostly live upon agriculture. Our entire



Silver Fligiree'Chariot

social structure is built upon an agrarian economy. Even after attempts at urbanisation Orissa has remained predominantly a land of villages with clusters of hamlets amidst palm and mango groves providing ample scope for the art to grow.

Tradition is the binding factor and in spite of changes in time it sustains a continuity which reflects through Art and Crafts. Taste changes with the changes in time but specific forms that are in conformity with the intellectual and moral leanings come into existence during the historical process of a culture group in its search for adequacy. This search for adequacy and beauty touches every aspects of culture and when it takes into its fold the entire society it creates a culture, an art and a literature of its own. These forms never die and they stand as symbols for a society. Folk arts and crafts contain this truth to a fuller extent.



Reproduced replicas of temple figures from Puri

Folk art and culture started with the very existence of man. When we look to the wounded bison of the Altamira cave painting of Spain or the rock paintings of Manikmada or Ushakothi in Orissa we get the answer. Man discovered himself amidst a wild setting of picturesque land-scape and colourful animals and birds. Out of fear and queer acquaintance he started thinking and wanted to have the forms of animals in the cave painted or engraved to master over the hunting techniques. Or it might have so happened that he would have wanted to recapitulate in the memory, the pleasant incidents of a by-gone day—a victory over wild animals—painting started. Later magic and sorcery had their entry into this art making it more ritual. It is a strange conclusion that throughout the world the forms in pre-historic paintings are almost similar. Folk art has close affinity with pre-historic paintings and tribal art. Elemental forms simple and queer looking, peculiar compositions and bright colour shades are the features of folk art.

The subject matter of the folk art and crafts is derived from the myths and legends of Indo-Aryan stock described with fabulous imagination in the vedic epics and Puranas. Folk art forms an essential part of festivals and rituals held throughout the year in the temple and private houses. The temples and muths with festivals and rituals associated with them provide a strong ritualistic basis to Folk art. The close association of art and religion is best manifested at Puri in the Car festival of Lord Jagannath. The Car festival provides work to a large number of wood carvers and Chitrakaras for about four months in a year. Thousands of pilgrims pour into Puri. They on their return take with them toys and icons, paintings of Gods and Goddesses, etc. to retain them as monentos. The pilgrims patronise all these crafts and without the festivals and rituals several of the crafts would have become extinct long ago.

### Alpana

Alpana is an important branch and most celebrated form of folk art. No domestic function Vrata, Os-ha, thread ceremony, marriage can be observed without folk decorations. Folk decorations, folk songs, folk tales and folk dresses go together. There is joyous spirit, gay display, heart-touching vibrations and homely look in all these manifestation of folk traditions. Before the commencement of a ceremony an altar is made and over it Alpanas are drawn. Purnakumbha (earthen pot) beautifully painted by village women is placed, village folk attend the function putting on their gayful costumes, all sorts of jewellery, and sing folk songs. The atmosphere is charged and vibrates with an auspicious aroma. Along with the dowry sweetmeets and other consumables are presented in decorated pots to the bridegroom, the bride's face is decorated with sandal paste and Kumkuma etc. her palms designed beautifully with Mehendi, over her feet are drawn nice motifs in Alta (red). These are all the artistry of the skilled village women.

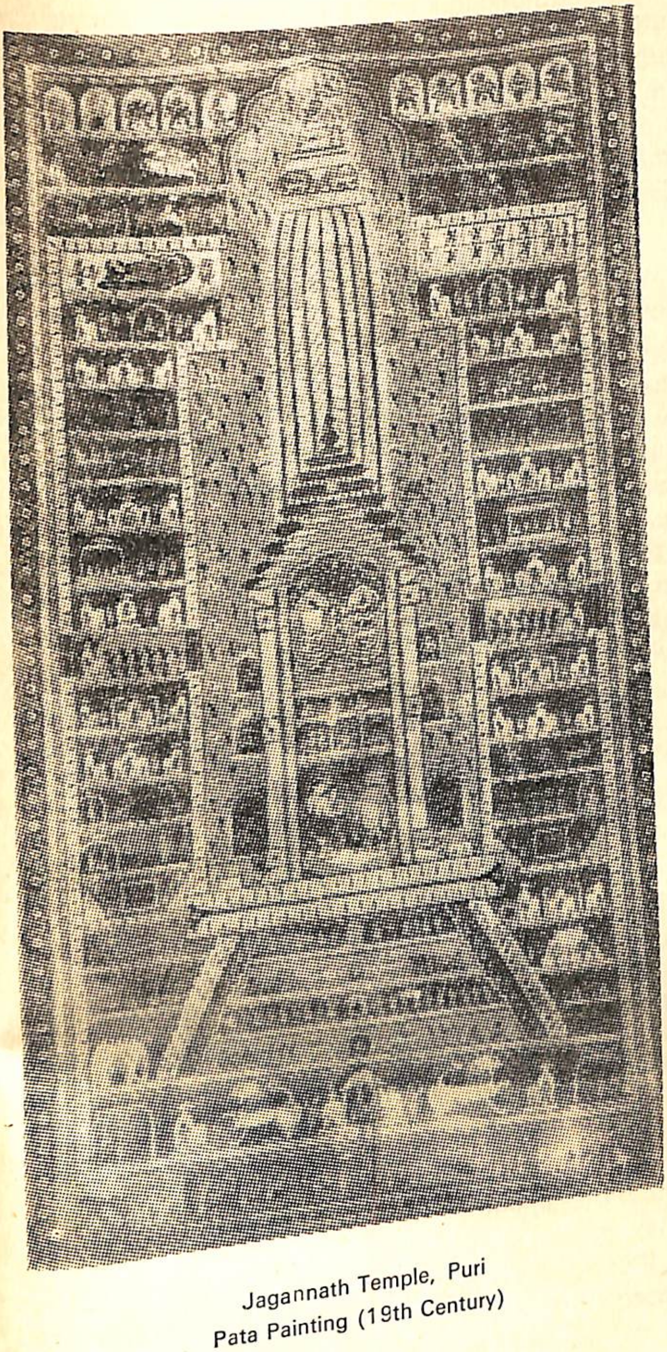
### Tatooing

Tatooing is another form of folk art which gradually loses its importance with the intrusion of urban civilisation. People had the belief that nothing would go into the grave when they die but the tatoos would on the body. Men and mostly the women have these marks on hands. In tribal areas they design it over the breast, cheek, chin, etc. Besides own names or the names of Radhakrishna, Shri Rama etc., the figures of gods and goddesses are scribed over the body with a crude nail and over it are applied some vegetable colour and it becomes permament. The village folk take pleasure in this painful execution of painting their bodies only to contain the belief and display aesthetic taste.

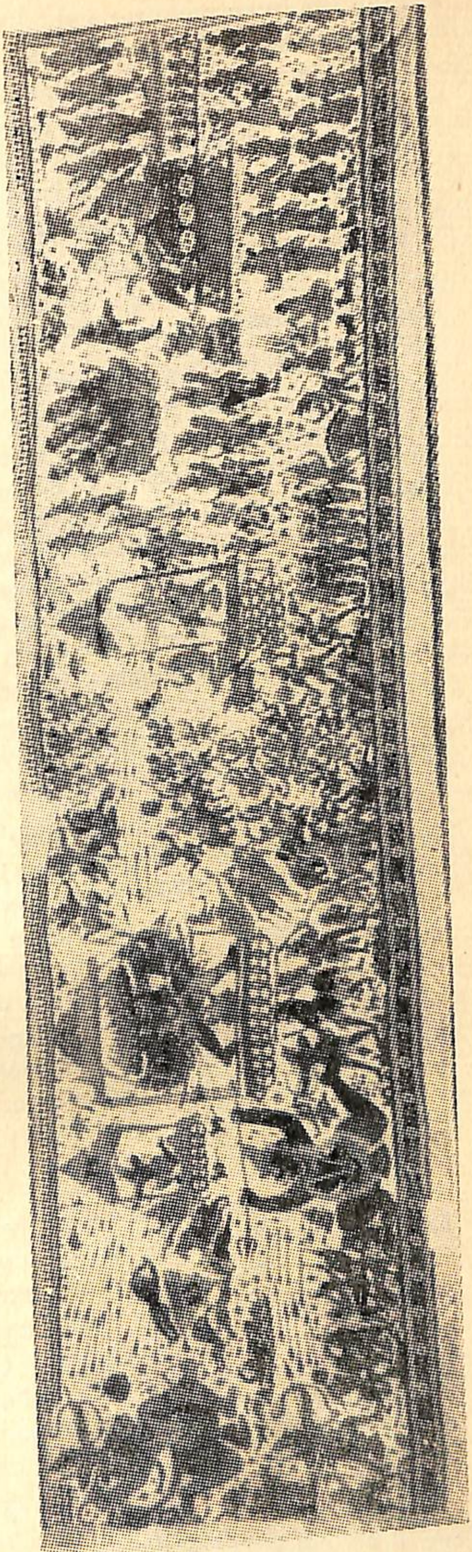
### Pata Painting

'Pata' painting is the most colourful folk painting of Orissa. The forms in the painting have been reduced to a few gestures and postures. The preparation of the 'pata' is done by pastings two or three cloth pieces with the help of tamarind glue and over applied a coat of glue mixed with chalk powder to make it smooth for painting. Even now after the invention of so many media of canvass, boards, paper, etc. the folk painters of Orissa mostly resort to the age-old tradition of preparing pata.

Untrained in the so-called schooling, theology and grammar the folk painter (chitrakara) starts with the brush drawing on the leathery surface of the pata (canvass) either in light yellow or light red directly. He has learned from his father and grandfather this style of drawing—a long enlongated broad eye. (Meena Nayana) on a profile face, a raised forehead, a strait line coming almost from the forehead down to the tip of the nose with a tilt



Jagannath Temple, Puri
Pata Painting (19th Century)



Ramalila Painting (19th Century)

at the eye brow-point for a sharp nose, well moulded lips and a globular chin, breasts well shaped (vase like), narrow waist, the buttocks (Nitamba) heavy to restrain the gaits for grace. In case of men a broad chest, slim waist, well built arms and legs. Then comes the second stage of filling in. The colours are limited to yellow (pihuli) vermilion (Sindur) Ultramarine Blue (Syamaraja}, zinc white (prepared from the conch shell). Over these forms are drawn delicate yet firm brush lines in lamblack exposing the details. Here the artist's merit, his skillful handling of the brush and his steadiness is proved. Then the painting is given on a woven for lacquering.

## Wooden toys

Wooden toys are done all over Orissa. The toys of Bargarh in Sambalpur district have a more pronounced folk character and have marked differences from those made at Puri. The artists at Puri are being influenced by the contemporary style followed in plastic dolls, allowing the original styles to dilute. But the Bargarh toys have retained their simple, childlike forms. Of the various types of wood available in Orissa "Gamhari" is widely used for toy-making on account of its fine texture and light cream colour. The horse, the elephant, the elephant with the rider on a wheeled cart, Ganjasimha, man and women etc. are generally the motifs. Doll-making is quite an ancient craft which is mainly produced for children though, at present, these have made inroads into the sophisticated drawing rooms of aesthetically-minded urban people. Wood carvings had also a ritualistic use in temples and in village homes.

## Clay toys

As a form of handicrafts, clay toys are found all over the country. Orissa toys have a beauty, which is at once simple and sophisticated; they are characterised by a natural refinement possessed by village craftsmen uncorrupted by external influences. With the development of communication, commerce and industry, our villages which were isolated for centuries, are being exposed to external influences. But western Orissa has the advantage of being in isolation for all these years. Barpali in Sambalpur district is famous for clay toys. Shaped at the hands of village potters on the wheel, they claim a tradition to stand in comparison with the forms of Mohenjodaro and Harappan terracotas. Elephants, horses, male and female figures, figures on wheeled carts are the interesting specimens.

## Dhokra Dolls

The very name is the suggestive of its tribal character. The Dhokras are adivasis and like their counterparts in West Bengal, they make metal articles purely for their own use. 'Sithalas' are also known as the makers of these curious looking dolls. Although fashioned in metal, they have a clay modelling chartacter done in lost wax or *cire perdue* process. After making the basic form, the craftmen used to decorate the with metal bands. Elephants, horses, lamps, Gajalakshmi, lamp stand with elephants, betel box, ordinary zali box, different gods and goddesses are done with folk-forms which have not undergone any change. These tribes are mostly nomads moving from villages to village, fashioning these specimens. The State Museum has huge collections of these Dhokra Dolls.

## Lacquer work

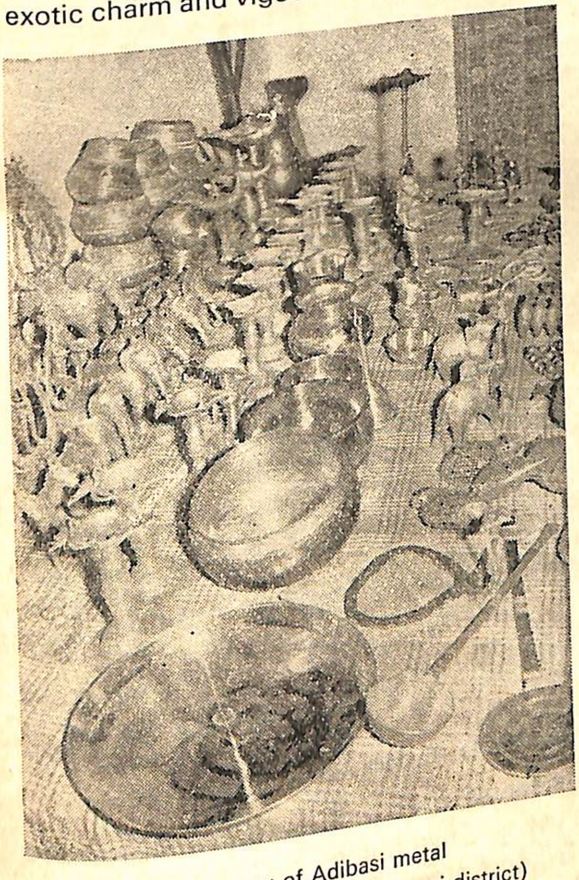
The bewitching lacquer works of Nawarangpur in the district of Koraput are made exclusively by female artisan known as "Sankharies or bangle makers. The bangles made out of lac and clay with ornamental lac work studded with mirrors are a must for Hindu bride on the day of her marriage. Besides bangles, boxes (used for toilet and other fashionable purposes), ornaments, toys, toycarts, Sriphala (auspicious fruit) paper weights etc. are prepared. In all these items the basic shape of bamboo clay, wood etc. are given multi colour and artistic lac finish which make them charming and presentable with folk motifs of fish, flower, animals, birds, etc. executed on them.

### Paper Maiche

This is a flourishing Craft in Puri town and Jeypore in Koraput district. Out of waste paper pulp they cast elephant, tiger, bear, deer, parrot, monkey, tortoise with nodding heads and limbs. These toys are brightly painted in pata style and are handy. The fascinating character about these toys are their nodding heads which give them a sort of movement. Besides these, masks of mythological characters are also made by these artisan for village theatres and decorative purposes.

### Bell Metal

Utility combined with beauty has created these shapes. Beautiful house hold utensils are made out of brass and bell-metal. The well-known places for these utensils are Kantilo in the district of Puri, Remuna in the district of Balasore Bhubana in the district of Dhenkanal Tarva in the district of Bolangir and Jagannath prasad in the district of Ganjam. A sort of flexible brass fish is made in Pital, district Ganjam. These fishes are so designed that they give movement and creat an illusion to that of real ones. The metal icons of Puri district is a heriditary craft which caters to the needs of the temples. The artisans make solid brass cast figures like crawling baby Krushna, ten armed Durga, Laxmi on lotus, pot bellied elephant headed Ganesh, Ram Laxman, Sita and Hanuman. These ritual items have exotic charm and vigour.



An array of Adibasi metal
Casting of Bholbeda (Mayurbhanj district)

Gaj Bidal in horn
from Parlakhemedi (Ganjam)

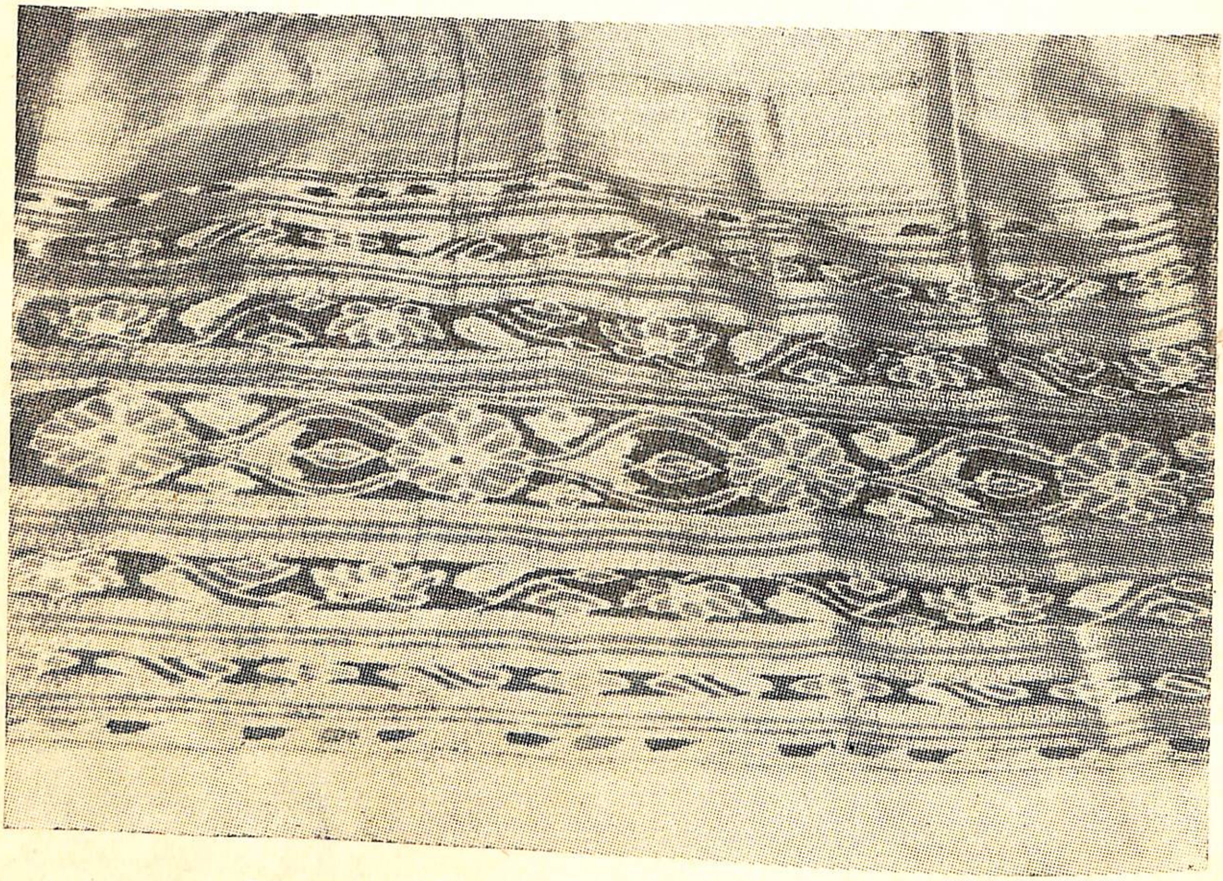
## Applique works

Applique works have close association with festivities and ceremonies although the modern use has elaborated irs scope from temple to drawing rooms. With brilliant colour patches in squares, circles and triangles Applique works create fantacies in colours. They prepare canopies,; Trasas," "Chhatris", bags, modern umbrellas etc. The artisans cut and shape coloured cloth into—parrots, peacocks, Ducks, gooses, lions, elephants, tigers antelopes, bulls, horses, Purnakumbhas, fishes, etc. and stitch them on cloth background to form harmonious and attractive patterns. The colours used are red, black, yellow, white. Pipili in the District of Puri is famous for Applique works.

## Textiles

The textiles of Orissa are famous for their rich variety of designs bold and unusual patterns, vibrant and yet subtle blending of colours, the unique tie and dye effect and a luxuriant feeling of texture. The majority of the textile weavers are spread over the districts of Sambalpur, Phulbani, and Sundargarh, while most of the weavers have a supreme Command over their craft. Some mastercraftsmen use with masterly effect, colours and patterns that are so inorthodox that few modern textile designers would dare use them.

The tie and dye technique of Orissa is an old and complicated process of dying the yarn in patches to produce the desired pattern while weavering. A peculiarity of this technique is that it never produces a completely vinished effect. This helps to impart a marvellous mellow and soft effect on the texture. Sambalpuri sarees, door and window curtains, bed covers table mats, etc. are the things of every day use in Oriya homes. Khardra Saktapada, Taraballi are some of the well-known names in Orissa Sarees. Orissan textiles are now-a-days gaining wide-market abroad along with other Orissan handicrafts.



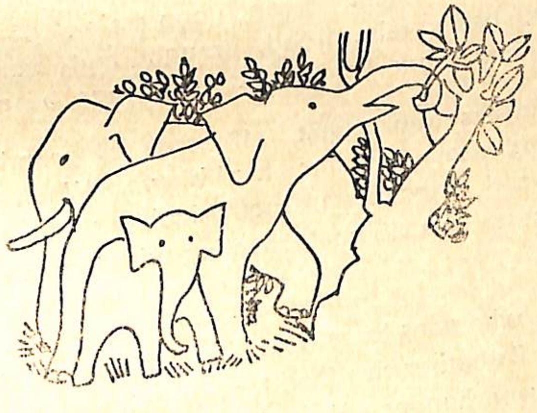
Pallu (end) of a Til & Dye Silk Saree of Nuapatna (Cuttack district)

The cut of Jagannath has ever remained as a perinial source of inspiration to the flok artisans. Particular mention may be made of the peculiar form and colour conseptions of the deities of Puri Jagannath has dominated our art and culture everwise. The forms without any details of eye, nose, ear etc, without hands and feet and even body is undoubtedly a tribal conception. What ever divinities might be attributed to them, still it offers a peculiar concept of neither a sculpture nor a painting. It is a sort of folk dost type though huge in size. Our poda painting colour theory has been derived from the colour of these deities.

Still we have many more forms of folk Art. All of them aim at once and the same goal, our Ganjpa, dowry boxes, dolls, painted pottery, Solapith works, golden grass works, and mats also bear the spontaniety of innocent and unsophisticated masterly touch of the village painted.

Machine has stood a rival to our folk art and crafts. People in the name of modern fashion are drifted away in their choice from the folk toys to the plastic dolls. People should be educated to appreciated the beauty of the folk wealth. For a time our Folk art received a set back in the preindependance period which is again revitalised because of the interest taken by the Government in the indigenous folk painters. It is also a happy finding that our folk art and craft are getting a good market abroad. But all Care should be taken to maintain the typical character in our products so that we may not be disillusioned in furture in the name of developments and progress.

Curator, Art & Craft
Orissa State Museum
Bhubaneswar.



# Charm of Workmen's Song

Dr. K. B. DAS

A cultivator's life is one of hard toil, stern realities and no dreams. His songs form a part of his daily work. They are not products of idle hours or flight of imagination. A cultivator sings while he works. Works and song go together each inspiring the other. Work becomes a labour of love for the sake of song.

A cultivator's song is very shortcut, three or four lines each, all composed in one or two metres. The last line is the longest. It is as long as a full breath.

His own experiences are the burden of his lip compositions. They speak of his struggle for existance, natural calamities and oppression of landlords and money-lenders. Scorching sun, heavy rain, flood, drought and storm do not perturb him. Hunger and thirst make him work harder and his songs become sadder but sweeter.

Sometimes hunger makes him forget all sense of propriety. He picks up a quarrel with his wife and deals her some hard blows. When his hunger is appeased, he repents for his folly and sings this unhappy incident in a song but in the name of a God and Goddess just as vaisnab poets dealing with human love in the name of Radha and Krishna.

Siva is the cultivator who goes to cultivate his land before Sunrise without taking his breakfast. His wife Parbati carries food for him daily. Unfortunately, it was quite late that day. Siva got very hungry. He notices from a distance that his wife was coming to him gaily decorated and in leisurely foot steps. He angrily asked her to immoiably explain the cause of this unreasonable delay to which she replied that she had to do all the domestic duties single handed and gave him long catalogue of daily work of a house-wife sweeping, cooking and feeding the children, etc. Hungry and angry Siva had no patience to listen to this. He caught hold of her fine and glossy hair with a force, but his heart melted at the sight of the tearful eyes of his tender wife.

The Gods and Goddesses of ploughmen are just like them—men and women of flesh and lood. They are not images of wood or stone or of any other metal, put in the dark temples and worshipped. They are hardworking and painstaking beings. They plough and level the ground, plant and weed out the fields like common people for their livelihood. They live in the hutments, take poor food and sleep on the bare ground.

"Ram and Lakshan are two brothers
Ram ploughs
Lakshan levels the ground
The two brothers scatter seedlings
Sita replants".

The ploughmen, the inhabitants of woods and drawers of water are simple but not foolish. They are not learned so far as book learning is concerned. But they are rich in experiences of life and their study of human charecter is based on reality and is infalliable. On the occasion of reaping and harvesting when they assemble in the field or farm, they portray the character of their master a miser or an exploiter satirically in a song.

"Our master a great giver
His wife equally so
She boils tamarind, gruel and water together
The cultivator returns from the field tired & hungry
She serves him with that only".

Ploughman's songs lack in variety and grandeur. But some of them are really beautiful not for the outward structure, but for the inner content. The deep pathos, the realistic tone, then naturalness expressed within the briefest lines can not but be appreceated by Readers.

A few songs of ploughmen are quoted as follow:—

1. "Clapping sounds are heard in the great temple
The temple is of silver
The yoke is of gold.
Bullocks are of diamond and jewels.
The ploughman is Vanamali himself
Rice does not taste well to Vanamali.
Cook the fish of lake Chilika with tamarind of sky.
If you like to please him."

2. "The wife of the master stood before me saying.
O Ploughman, sing a song
I have not studied in the village school.
Nor have I ploughed in company of singing ploughmen
My bullocks are old
Tired and exhausted with them
What shall I sing."
Alright, O dear ploughman
Somehow manage this year with these
I shall purchase new ones next year, with gold rings sold
'O noble lady, let the ear rings be in your ears
I shall manage with the old bullocks."

3. Your youth full as a river over flooded
Like a crow with its beak
If I sip your youth
Will it ever be exhausted ?

Age of bullock cart has passed. We do not see carts with men and materials going to distant places. Cartmen's songs are rarely heard. A few of their songs are quoted below.

1. Without oiling the cart properly
   I drove on
   My elder brother's wife scolded me.
2. Soft plantains have been fried in butter
   O my husband's younger brother,
   You are too young.
   Do not go driving the bullock cart
   What pleasure can you get from it ?
   Your wife—a girl of sixteen
   Under whose charge will you keep her ?
   I shall keep her under my younger brother's charge.
3. The song of the Cartman is heard from a cluster of trees.
   The cart has now come back

Power boats have now occupied the place of country boats as means of transport of men and materials to far of places. The boatmen row over the river where no bridge has been constructed. Folksongs are now rarely heard from the lips of boatmen. Younger generation rather prefers cinema songs. A few boatmen's songs are quoted below:—

1. Measureless the depth of the river
   A stone raft is floated
   O mother Mangala,
   Lend me your helping hand,
   The raft will move itself.
2. Smooth the surface of the lake
   Carved the river's course
   An untimely pumpkin flower floats away on its ripples
   Let it float away in the current
   My beloved should give words of certainity.
3. What song did you sing in that corner or the boat ?
   Would that sweet sixteen come
   Come to the river bank to wash rice and listen ?
4. Radha and her attendants ran to the river.
   It is already evening.
   O boatman, are you not there ?
   O yes, I Banamali, have kept ready this dilapidated boat
   Radhika, my dear aunt, please take your seat
   in the middle of the boat for your back side is
   heavier than the front.
   So saying he rowed them over the river.
   As they stood on the dry land
   He slyly asked for his fare !

Udaya Sree
Mahatab Road, Cuttack-3

# What about Theatres of the People for the People.... ?

Shri DHIREN DASH

A nation is known from its show-houses. There are still people around us who believe that it is the out-ward show of the building which is meant by this saying.

Theatre is the place where the culture of the people is displayed, be it dance, drama or music. It is the type of the programmes which goes inside the building that reflects one's culture.

A national theatre should in the fitness of things emit the fragrance of the cultural heritage of a nation and should, apart from its exterior loveliness, be in harmony with the atmosphere of the country and the traditions of its people.

It is on this context let us try to examine the theatres we already have here, there and every where in our country. Do they really cater to the needs of the demands of our traditional culture?

We have then to understand our traditional culture as regards dance, drama and music is concerned.

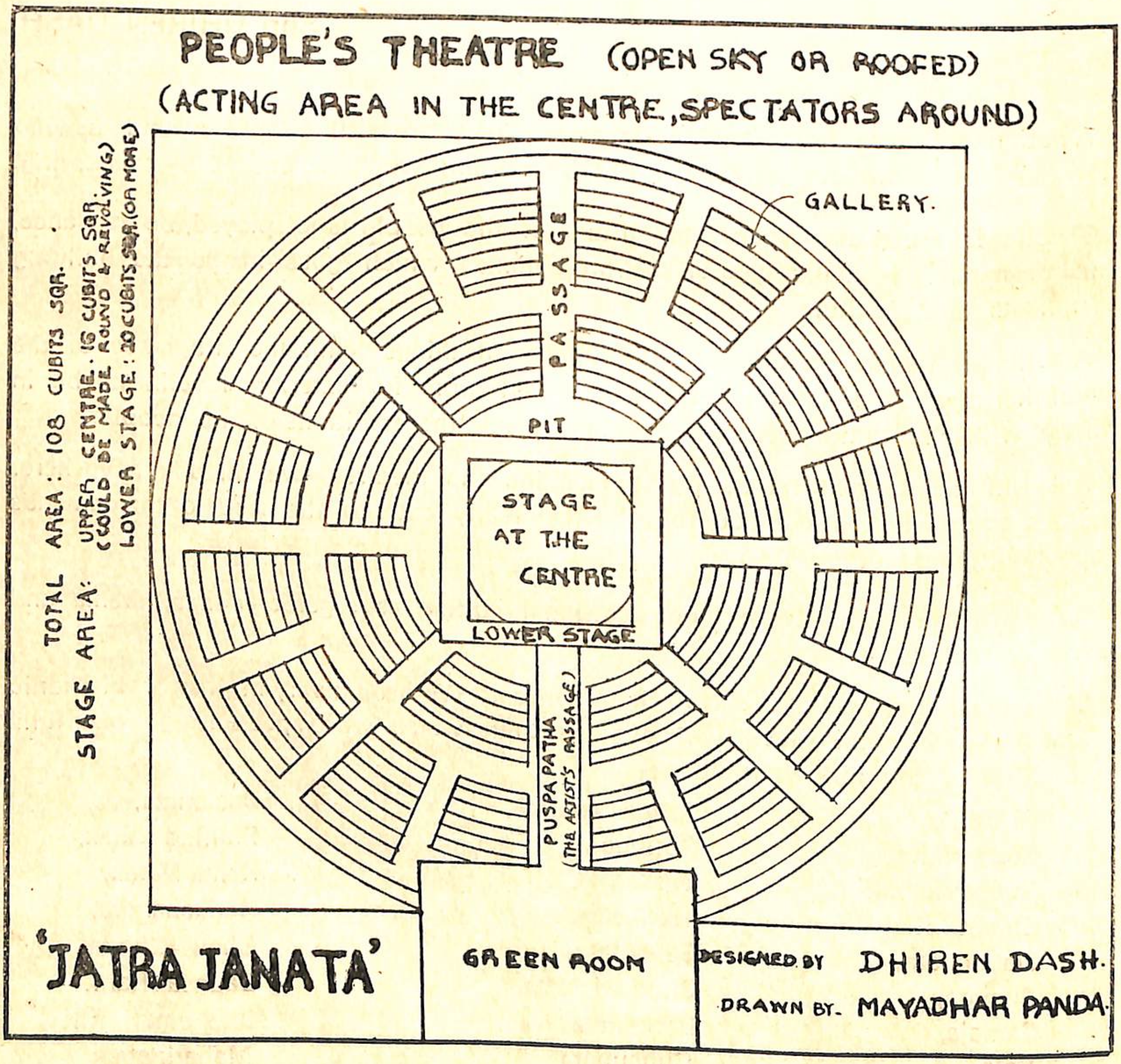
Let us take the case of our own State, Orissa. We have a very big list of histrionic art-forms and to name a few, we have the Jatra-walas who specialise in one form or the other of the following items:—

Ramalila;
Krushnalila
Radhapremalila,
Bharata-lila,
Dandanata,
Suanga,
Samaja,
Pala,
Sabdaswaranta,
Gotipua,
Daskathia,
Harikatha,
Sakhinata,
Ghuduki-Nata,
Bandinata,
Chhaunata,
Desianata,
Prahlad Natak,
Rama Natak,
Harischandra,
Chaiti-Ghoda,
Baunsa Rani,
Bhanumati Khel,
Maharinata

Odissi Nata (not the present form) and many other Natas, Nachas, Khelas, Lilas, etc., etc. How many of these forms can be presented in its true original style in our so-called available theatres ? The answer will be a big "NONE". More than ninety-nine percent of Orissa's traditional histrionic arts CANNOT be performed in its true, original style in any of our existing theatres, because the demands of the production styles associated with these performing arts cannot be met by these structures. Attempts have been made either deliberately or unconsciously, on several occasions to squeeze these forms to fit into the pattern of the so-called theatres, but the result always is crude, boring and useless.

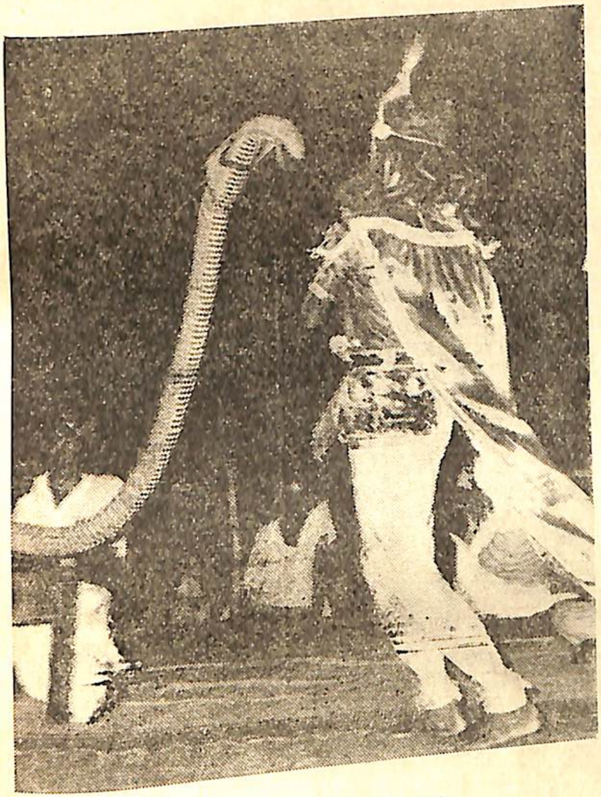
Let me try to explain.

Take the case of any item from the list, Dandanata or Bharata-lila or anyone. The demand of the production of these items is the absolute need of an ACTING AREA IN THE MIDST OF SPECTATORS. The artist are by tradition so well habituated to a style of movement on the stage that the spectators on each of the four sides feel as if it is meant for them or in other words no side is ignored or neglected and the whole thing is enjoyed equally by the entire mass around.


PEOPLE'S THEATRE (OPEN SKY OR ROOFED)
(ACTING AREA IN THE CENTRE, SPECTATORS AROUND)
TOTAL AREA : 108 CUBITS SQR.
STAGE AREA: UPPER CENTRE. 16 CUBITS SQR.
(COULD BE MADE ROUND & REVOLVING)
LOWER STAGE : 20 CUBITS SQR. (OR MORE)
GALLERY.
PASSAGE
PIT
STAGE AT THE CENTRE
LOWER STAGE
PUSPA PATHA (THE ARTIST'S PASSAGE)
'JATRA JANATA'
GREEN ROOM
DESIGNED BY DHIREN DASH.
DRAWN BY. MAYADHAR PANDA.

Can it be done on the so-called theatres with wings, proscenium and spectators on one side ? The exquisite beauty of performance of moving or facing alternate sides by a natural, artistic stylised gait, turns, twists and whirls are all lost. The artists feel cramped.

Just imagine the distant green room (Vesha Ghara) with the narrow Pushpapath (the flowery passage) wending its way amongst the spectators upto the central acting area. Though this is just a passage, it is in fact, also an important acting area. And to compare its potentialities with those of the present day theatres, there is none, where just stepping-out few feet from behind the wings is considered a big thing. You can always get away with the patch in your pant.



A Scene from Krishna Lila

King Hiranyakasipu arriving on a dummy elephant

Just visualise our traditional Prahlada Nataka with two groups of musicians in attendance. While one group standing or sitting near the acting area provide musical accompaniment and chorus for the play, the other group waiting near the green room provide the band music while leading the entry of important characters upto the acting area like a ceremonial procession complete with fire-works.

I think this stylisation has no parallel anywhere in the histrionic world. This sheer thing ot beauty can never be possible, if this form is forced to be squeezed into a so-called theatre with wings, proscenium and screen.

To cap all, we have styles like Daskathia, Pala and Ghuduki-Nata, etc., where although the green room is not required during the time of the performance, the central acting area with spectators sitting all-around is most essential. Once the artists appear on the acting area, they remain there till the whole show is over.

And so, what is the good of having theatre-halls which do not hold good for our own performing arts ? Whom are we looking up to give us the necessary courage to boldly say that these existing theatres are USELESS FOR OUR CULTURE ?

I recall a saying of my Guru Mr. Charles Elson, who after having stayed for
months in India to study Indian Theatre, told me, "I have seen many plays per-
formed at many theatres, throughout the country, but I have yet to make-up my mind
as to which was the true Indian Play presented in an Indian Manner". I think this
statement of Mr. Elson is self-explanatory and does not need elaboration. With bagful
imitations, plenty of borrowings, we only display our bankruptcy of ideas, devoid
of any originality

JATRA

Can we not produce an Indian play in an Indian manner ? We must know,
what makes an Indian play identified. If it is the character of a Deity which identi-
fies it as an Indian Play, let me quote Marie Seton "Deities do not really fit within
pictureframe theatre, they belong to the amphitheatre." If it is the prescribed style
of writing let us search for one. All plays are not Natakas. And Natak happens
to be just one kind of play out of the twenty-eight varieties known to Indian dra-
maturgy. And about the Indian manner of presentation, let us also search for a
theatre built according to the prescribed rules of Natya-Sastra, the Vikrsta, the Caturasra
and the Tuyasra of the Jyestha, Madhyama and the Avra sizes.

All civilised countries in the world, be it Russia, China, England, Japan, France, Germany, America, have their own National Theatres based upon the traditional styles of presentation of their performing arts.

While England has its Elizabethan theatre, Japan has its Kabuki and the Noh Theatres, India, with its oldest civilisation on earth and its documentary an hoary evidences of existing theatre designing in the past, still looks westward for getting an inspiration to build its own national theatre in India.

All our present day theatres have a borrowed pattern of design. According to Maric Seton "The theatre with the stage framed by the proscenium arch was introduced into India because of the presentation of European plays, presumably intended for the entertainment of the British in India".

Well, we had entertained them enough. Since 1947 they have already returned to their homeland. They do not need this entertainment from us. Let us now help ourselves in attempting at least to entertain ourselves in our own manner.

Folk Dance

The prevailing system as is being followed until now, must be made to vanish forthwith. Let me quote JP's words from his "Prison Diary" of September 25, while explaining Fritz's article. JP writes:

"Now what would be the prevailing system in India and its philosophy? That is a very interesting question. Is there a system first of all? While 80 per cent of the population lives in the villages, 20 per cent of it is urban. Some of it is made up of industrial labour, some of the class IV employees and yet some more of the class III employees. .........Leaving out industrial labour and class III and class IV employees, there are economically betteroff people, a tiny part of them quite affluent in the western style of living sense. Then there are students, school and University. There are officers of Government and Ministers (in the capital cities). If there is a system it is made up of these elements and the sysem's philosophy is that of the educated and economic elite. The elite from the rural areas are being sucked into urban areas..........All politics, all education, all privileges are confined to this tiny layer of Society at the top........In India, this tiny layer of the elite, barring rare individuals, wants more modern technology, more industrialisation, more mechanisation and chemicalisation of agriculture. That is the ethos of modernism in India........," etc.

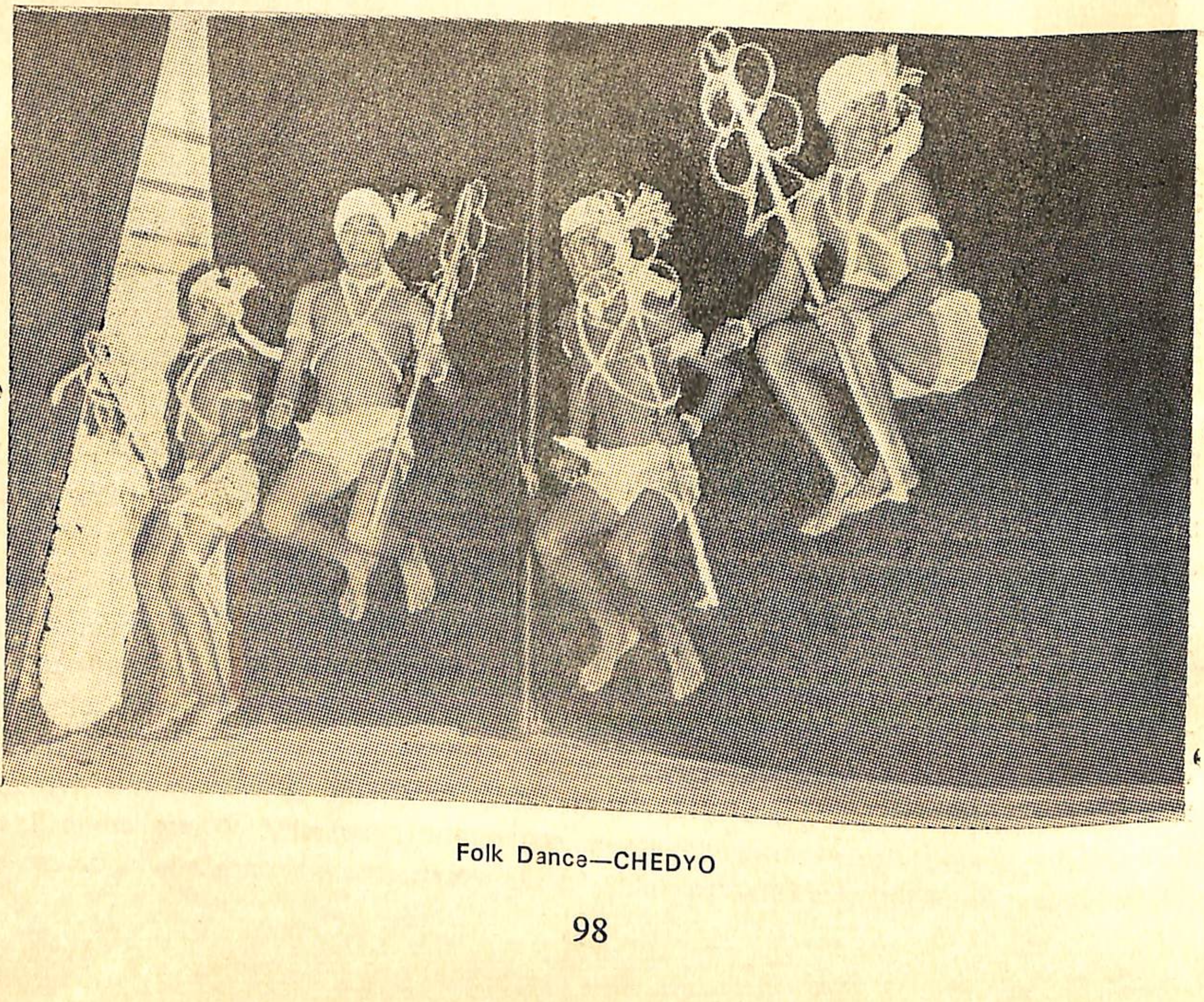
The "modernism" has brought us all the confusions even in the sphere of dramatics.

In India, the music school teach music both classical and folk i. e. Hindustani, Odissi, Karnataki and so on. None teach modern music.

Similarly the Dance schools teach both classical and folk dances i. e. Bharata Natyam, Kathakali, Odissi, Chhau, Kathak, Manipuri, etc. and so on. None teach modern dances.

But in the sphere of dramatics we see a different state on affairs. Our drama schools rarely teach classical or folk Indian dramas or the classical or folk style of presentation The stress is on the so-called Modern or Foreign. Why? What for is this attitude? Do we teach for the "tiny layer of the elite"?

Even the question of how far "National" is our National school of Drama has been a subject for discussion for some time past. As Kavita Nagpal wrote in Hindustan Times while commenting on a "Non" play of the NSD. "It would perhaps have been more profitable to expend the same time and energy in training the students to tackle the traditional forms of the regions from which they come and to which they finally raturn to practise the art of theatre."



Folk Dance—CHEDYO

Few years back, a very famous Director in India had taken his very famous group to represent India in an International theatre convention held in a foreign country. His statement after return was sufficient to warrant alarm as he had said : "I wish my group had not been deputed to represent India."

When we say "Indian" we do emphasise on an unique pattern which is original and perfected by tradition of thousands of years and that represents our culture. In building theatre, our responsibility is more because what we construct with cement and mortar physically lasts more than half a century at least. We do not spend a lot of money and name it a theatre which in fact turns into a godown or something other than the purpose for which it is intended. A lot of theatres built through out the country have proved "No good". Here I quote from the editorial of theatre arts journal "Natya" of winter issue 1959-60.

'Ranapa' Dance

"The story of architectural efforts in post-independent India has, on the whole, been depressing. This is chiefly because of what appears to be a confusion of approach towards style—whether to be "traditional", blatantly imitative of the West, or to combine, howsoever manstrously, the two. Then there is also confusion about the relationship between form and function. And so, we have some building which are pleasing in form but totally inadequate for the function they were intended while there are others which are extremes in functional values without any grace of form, yet others without form or function. But in being inept in all categories Government architects have been proned to show particular genius. Perhaps there is something in the bureaucratic mould all over the world which tends to induce passive mediocrity".

"A few theatres already built by them are sufficient to warrant alarm. For reasons which are not immediately obvious most of these theatres are built against almost every basic principle of theatre planning. Beyond the fact that a theatre has place for seats and a place to act upon, few other considerations seem to have been borne in mind or even suspected of existance".

"Theatre construction requires not just the ability to rig up an architectural assemblage but a clear conception of what use the building is put to. Even with the assistance of specialists, the architect will need some awareness of the development or drama and some clairvoyance, as it were, of its future trends. His building will have to be flexible enough to accommodate not only for plays but for other forms of theatre arts. And for plays he may have to choose between the rigid picture-frame and the free arena stage. Where do we stand ? The future course of dramatic development in India may well depend upon the very physical form of our theatre building".

'Dhudiki' Dance

I think, enough had been very clearly said and we still suffer from an inferiority complex. Until we gather sufficient courage and boldness not to be imitative of the West, we will be continuing to waste a lot on something we cannot claim to be our own. Let us search our heart. It is high time to do so.

We think of rural development by way of electricity, roads, culverts, fertilisers, pumps and what nots. What about theatres for the rural people ? Why should more than 98 per cent of the people of the country wait until fair weather to witness a play or some theatrical presentation in the open air in an improvised auditorium on the village cross road or in an urban area wait until midnight till the traffic of the "elite" withdraw from the roads to avail a suitable open space while the city folk just walk in to airconditioned, push-back cushioned seats whenever they desire ?

And when shall our rural folks have their own indigenous Jatra-auditoriums both top-less top-covered ?

Chhau Dance

'Chaiti Ghoda' Dance

We waste a lot of money on the so-called modern drama festivals which have absolutely no impact on the people. We also waste a lot or money to build theatres and to train people to entartain that "tiny layer of the society" without even caring to know that either the forms or the functions, do not really cater to the demands of more than 98 per cent of the people of this vast country. In other words, where is the THEATRE FOR THE JANATA—the people's theatre ?

Now let me quote Marie Seton again who states "Since there appears to be an ingrained tendency in in India towards Theatres in the Round, I wonder whether it is not unsuitable for India to continue to develop theatres with stages based upon a stricty western model".

Think my dear countrymen, think........and act now, otherwise it will be too late to recover from the shock.

Sahitya Sangeet Natak Akademi
Orissa

# Agricultural Festivals of Orissa

Shri NILAMANI MISHRA

Orissa is an agricultural State on the eastern region of India. Almost ninety per cent of the people either line on agriculture or indirectly connected with it. The people were agricultural landed peasenty and were ever prepared on demand to fight with the invading enemy or the expeditions conducted by the Emperor of Orissa. They enjoyed the tenancy rights for the emergency services pertaining to the force required for the defence of the land.

Since the annual rainfall was high and conducive to the rice and ravi crops the people devoted much of their energy in the agricultural practices devoid of industrial activities of note. Any gap in the time devoted for their crops was spent on enjoyment which was either named by a festival or the occasion was subsequently named as such emanating from the emjoyable occasion so performed voluntarliy. But these festivals were taken names particular to the region which was based on agriculture only and were distinctly Orissan in their nature. Among these festivals Halasutra, Akhyaya Tritiya, Raja Jatra, Gamhma, Chaturmasya Gurubara, Garbhana Sankranti, Margasiramasa Gurubara and Makara Sankranti are the main bearing a minor few.

**Halasutra**

After the harvesting season is off and the first shower of rain drench the dry land the preliminary efforts are made to repair the plough-share and other necessary equipment of agriculture. There is no date specific for the purpose and according to the convenience of the land owner he engages a new tiller whom he recruits with new robes and a feast. Further, the tiller gose to the field and starts ploughing for the first time in the land which becomes ready for sowing the seeds. After the ploughing of the land is complete and thorugh for the new year which keeps the man engaged for the whole oncoming agricultural year the seeds are sown in the field on an appointed day which is called Akhyaya Tritiya.

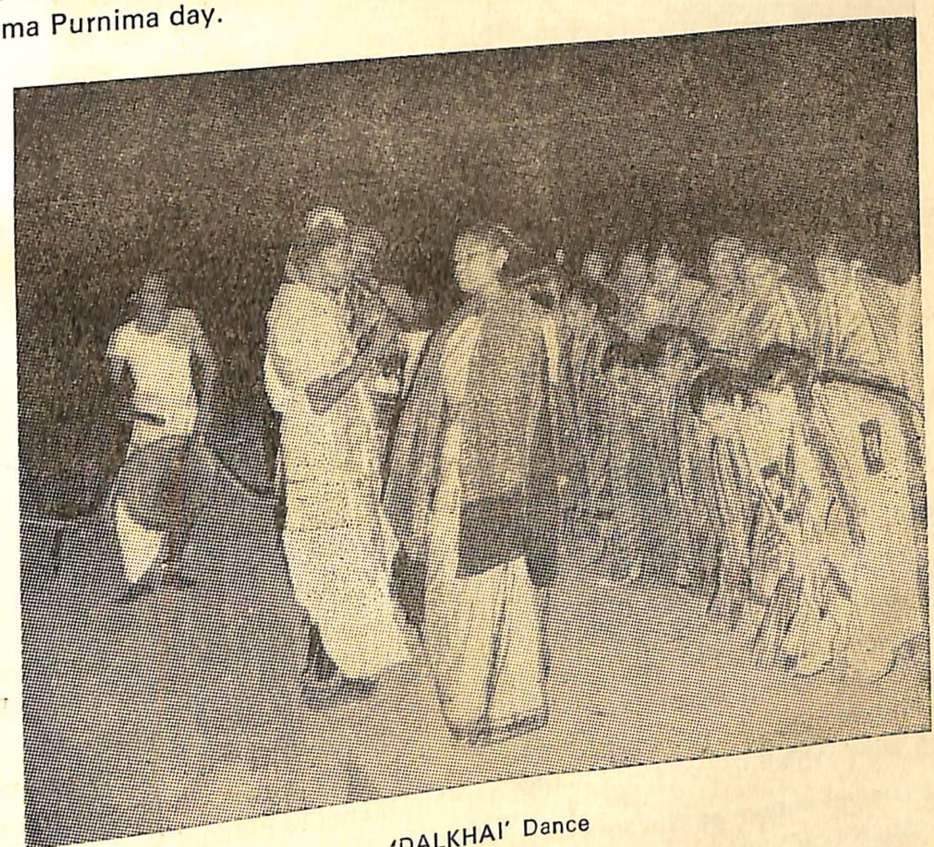
### Akhyaya Tritiya

In the almanac of the Indian nation though this festival is found mentioned, yet there is a specific attraction for the Oriya tillers, which is regarded as an auspicious day par-excellence. The occasion in the third day of the bright fortnight in the month of Baisakha. The exact moment is calculated as per the zodiac and planet of the individual who sows and owns the land to have a bumper crop in the coming year. A new measuring container locally known as "gauni" is brought in which a palm-full of seeds are kept and offered to Goddess Laxmi with the hope of yielding more produce and is taken to the field. At the field, on the appointed moment a suitable patch of land on the corner of the field is sown with the seeds after due reverence to the goddess of fortune and the tiller returns home. In the belief of the Oriya tiller, it features in a way which holds that if a palmful of seed is sown on the name of Laxmi then there will be no disaster to the crops for the coming year. As such this is named as Akhimuthi or the

palmful of undestroyed seeds and the third day as Akhyaya Tritiya. As the occasion is auspicious the owner of the land and the tiller observe fast for the whole day or till the sowing is over on that day, enhancing the gravity of the commencement of the agricultural year. This is peculiar for the Orissan landowners which is conspicuously absent in other regions. Some observe it in a way which tell us that after the sowing is over, the spirits of the ancestors are invoked and offering of libation and sacrifices for Visvadevas are made for the paddy crops to grow unaffected in the coming year. Another festival which is known as "Chandan Yatra" starts from this day. In this occasion sandal paste is annointed on the body of the lords-Jagannath, Lingaraja and Madana Mohana, who go out for a pleasure trip on the boat. This festival continues for twenty-one days. It is observed almost all over the land of Orissa where a deity is housed by a pond or lake. Most probably this is observed with the sole intension to please the tillers of the land who boil their skin under the summer sun during these days to till the land. At the close of this festival the monsoon breaks to pour heavy showers. But during the festival the peasant anoint his body with sandal paste and takes longer hours of bath with the gods, which heals his boiling skin under the scorching rays of the Sun and keeps him engaged through out the unbearable heat. The coming of the rains is observed in a festival of Orissa known commonly as "Raja".

### Raja Yatra

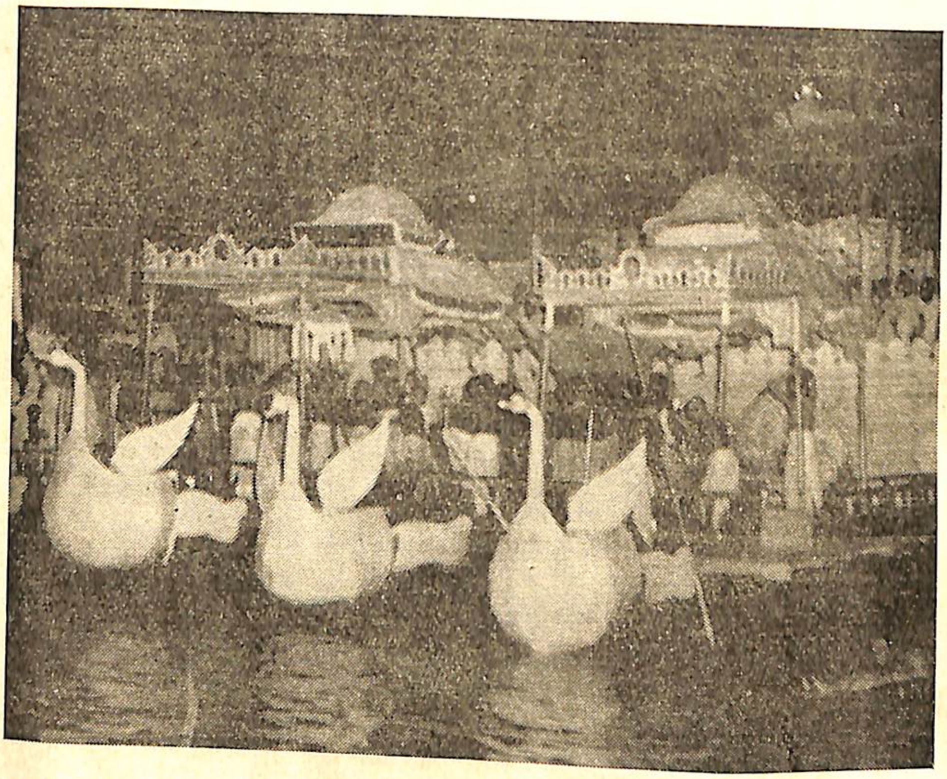
Raja is a national festival of Orissa. It is nearly one thousand years old. The famous Smrti writer of Orissa Satananda Acharya has mentioned in his book "Satananda Sangraha" about the Raja festival. According to him this is observed for three days. Commencing from the solar last day of Taurus or Vrisha month and continues to the first two days of the month of Gemini or Mithun. The essence of this festival is that the land is not touched by any weapon-even the dames prevent their feet from touching the ground. The peasants believe that the Goddess Earth undergoes menstrual cycle during these days. As such she should be prevented from being disturbed in any manner. These three days are the days dedicated to rest, play and any kind of amusement feast, etc. The preparation for this festival in Orissa commences much prior to the occasion. The young unmarried girls prepare cakes of various forms befitting to the occasion and they enjoy swinging to observe the festival. Most probably this is observed to allow the crops to grow for sometimes on the advent of the monsoon rains. Minor works on the field by the plough and bullocks continue till the Sravana Purnima or Gamhma Purnima day.



'DALKHAI' Dance

### Gamha Purnima

This is also known as Balabhadra Yanma. Though it is observed as a Rakhi—Bandhan day, almost throughout India, yet there is less of its observance in Orissa and there was a time when it was not prevalent in Orissa. The bullocks take rest during this time since they have no more work in the field. So they are washed, anointed with sandal paste and vermillion and decorated with garlands in honour of their Service in the field meant for agriculture. They are offered cakes. The Balabhadra Puja is observed on this occasion. The other name of Balabhadra is Samkarsana, meaning the expert of thorough cultivation. Efigies are made in the Brahmin villages on this occasion and worshipped. The special feature of the day is that, Brahmins, Khatriyas and the Vaishyas were sacred threads on this day. Even Lord Balabhadra in the temple of Jagannafh is offered sacred thread to wear. Beginning from the tenth day of the bright fortnight till the full-moon day, the Gods go to enjoy the swing which is known as Jhulana Purnima in Orissa. All the Vaishnava temples observe this in a sacred fervour. Another festival is observed during this period which is known as Chaturmasya Gurubara or the Thursdays of the four raining months. On this occasion Goddess Laxmi is worshipped. Even on Purnima day of the month of Vadra Lord Indra Deva is worshipped. This is known as Indra Purnima. God Indra is propitiated to cause heavy rain for the crops to grow. The next stage of development in the crops reach to the time of Garbhana Sankranti day.



## Garbhana Sankranti

The first day of the solar month of Kartika is known as Garbhana Sankranti. The crops are grown to bear the grains during this time in the field. Orissa being a coastal Land it is subjected to rain and whirt winds. This causes severe damage to the crops. As such, the God of wind is propitiated to prevert the new crops to be destroyed. The peasants plant branches of the trees in the field. This is to prevent the crops from falling down due to wind which is protected by the garding branches planted in the field.

Another festival known as Navarna is observed on this occasion. This means that when new "Suan-rice" crops are harvested, an auspicious day is fixed suitable to the family who eat for the first time the new crops. Now this is mainly observed in western Orissa very pompusly.

### Margasira Gurubara

Each thursday of the month of Margasira is observed as Manabasa Gurubara. Goddess fortune or Laxmi is worshipped on this occasion. The new crop or the paddy bunch, with new rice are placed as an altar for Goddess Laxmi who is invoked and worshipped with cakes and milked rice known as "Paiyas" or 'Kshiri'. A ballad poem, named as "Laxmi Puran" is recited to establish the greatness of the Goddess Laxmi in every house. This preaches abolition of caste system as well as untouchability.

On the occasion of finishing the harvesting each peasant observes 'Khetabadha' or the ending of the harvesting season. The last blade of dry crops are reaped and the Goddess Laxmi is worshipped in the field.

### Makar Sankranti

Soon after the harvesting is over, there appears practically a void in the agricultural year which commences after two months. So the period in between is to be enjoyed with rice soaked in molasses and with other new products like plantain, sugarcane, cocoanut etc. Lord Jagannath is offered with this and the occasion is enjoyed by all. This is observed in all the places where a deity is worshipped. The tribals of Orissa observe it with much pomp.

From these festivals it appears clean that the people of Orissa after toiling hard in the field and after a days of sweated labour enjoy the leisure and believe in worshipping the gods and goddesses to get more crops.

Curator, Orissa State Museum
Bhubaneswar

# THE SPIRIT AND SEASON IN ORISSA FOOD

S. M. GANI

Not surprisingly, you need to put your hand inside the mouth of a tiger to be able to satisfy the culinary taste of the people of Orissa. The tiger may be alive or dead, no matter. Such hands are believed to be the best skilled for preparing delicious dishes to suit the pa-late of the people living in this part of the country.

One should have a savoury taste to enjoy the varieties of Orissa food, in preparation of which, one attains proficiency by risking his hand in the mouth of a carnivorous. The standards are rigid and quality pre-destined. Slight variation in colour, texture or flavour is out right degrades the preparation.

A meal is more complicated and complex when items are so numerous. But in Orissa compiling a menu is no problem the season and the traditions are your best guide. Principaly rice-eating area, rice is viewed with great respect. The housewive will specify the kind of rice she wants to use for a particular dish either the long grain, round grain, flavoured, polished or par-boiled rice. Rice is the heart of every meal. When they dine there is always a mound of white grains poured in the centre of the plate or leaf. Eating on leaf is considered most hygienic. It is used once unlike metal and clay crockeries.

Rice is the manistay of the every day diet. Other items vary in different areas according to physical and climatic conditions. Orissa is an extensive plateau which slopes gently into the coastal plain along the Bay of Bengal. The Mahanadi flowing west to east through the plateau cuts it into difined parts. The northern part is an extension of the Chotanagpur plateau and the southern part is covered by hills known as the Eastern Ghats. There are thus four well defined physical regions of the State, the northern plateau, eastern Ghats, the coastal plains and the river basins of the central table land. The climate of Orissa is characterised by high temperature and medium-to-high rainfall. There is a coastline extending to over 250 miles.

Great civilizations always produce great arts, and in Orissa which has a history stretching back to thousands of year, the preparation of food is truely a great art. The Orissa cuisine may not be the finest but it is surely convenient and nutritions. The State nor the people could be called rish in wealth. Because of this, the diet the people of

Orissa evolved over the course of centuries is heavily reliant upon such foods as rice, roots and vegetables which are inexpensive but filling. Fresh water fish, sea food and pulses supplies the protein in the Orissa diet and play a big part on the Orissa menu.

To an Oriya, the essential part of the harmony in a meal is variety. The meal would consist of highly spiced dish, heavily seasoned or bland, a smooth accompanied by fried cripsy dishes, there will be salty, sweet and sour. To suit the summer season there will be liquidy food or rice dipped in cold water, popularly known as Pakhal.

Rice is also parched or puffed. Cakes made out of rice flour called 'Pithas' are the most popular snacks. Rice flour, sugar or gur with coconut or cottage cheese (CHHENNA) constitute the base of the most delicious and attractive sweets. According to availability in season fruits like Banana, Jack fruit, mangoes, Palm, etc., are fried or steamed. Every festival has a special preparation. Festivals are many. The housewives religiously observe the tradition and prepare the Pithas at home for offering to god and then to the family and friends. The Pithas are the same the Aryans called Pishtakas.

The food habits of people of Orissa has undergone several changes as it had the influence of both Aryan. Dravidian and those of the South-East Asian and Pacific islands. Some of the rice preparations in Orissa may not look new to an Indonesian or Burmese. The Cakes and sweets are Aryan. The yoghurt, cocoanut and sour, hot food from the south believed to be a kin to south Indian habits.

Orissa still has a good number of tribal population though they are no more as isolated as 30 years before. But still in some pockets their food is till simple which is characterised as wild. The people living on hills with not much of rain and irrigation facilities have to depend on foods and Tubers and shikar animals killed in forest for food.

The people of Orissa are not strictly vegetarian. The population on the coastal area or on river bank eat fish and the people in hill area eat meat and poultry. In certain tribal areas drinking of milk is a taboo, as it is believed to be a sin to take away the share of the calf. Because the yield of milk in these areas are very low which is just sufficient for the survival of the calf.

The State of Orissa was formed in 1936. It was previously exposed to the influence of Bengal, Bihar and Madras by its administrative links. Officers and men had to live in these States who has adopted the local food habits of the area they lived. Hence, it can be clearly seen that the people habiting the district of Balasore have esimblence in meals to that of Bengal, of Keonjhar and Sundargarh or Sambalpur to that of the Chotnagpur, Plateau extending to Singhbhum of Bihar and of Koraput and Ganjam districts to that of Andhra.

People of Orissa like community feeding. For every occassion or celebration ends with a feast for the gathering. Feast following a puja or religious functions are always vegetarian and simple. Rice, boiled or fried dal, vegetables of the season, a sweet and sour chutney concluding with a sweet dish, generally a payas made out of rice. Feasts held in connection with other occassions always has a fish curry on the menu. Fish curry, fried fish, fish with yoghurt are very common. A mixed vegetable curry with the bones, heads and other enever pieces of fish is a popular and delicious dish called "Chechheda". On wedding feasts several preparations of fish and more than one kind of sweet are must.

On religious functions and other ceremonies particular food suiting to the season has been fixed. It may look strange but it is true the every Oriya home would be eating the same kind of preparation on days of such religious festival. Even the vegetables and other ingredients is prescribed for the preparation of food.

The believe that Lord Jagannath himself had ordered to serve him cooked food, goes to prove that cooking in Orissa was very advanced. When compared to South Indian or North Indian the usual menu of the meals are fixed, whereas in Orissa the menu varies day after day and there is complete change with the change of season.

All the important temples in Orissa offer some estables as 'Bhog'. Therefore the major temples in Orissa have a separate eddific called the "Bhoga mandap" to facilitate offering and distribution of food to the pilgrims.

The dishes are so scientifically grouped that any kind of foreign influence has not changed the food or the art of cooking or the habits of the people in recent times. There is no trace of Muslims or Christian influence in the food habits of Orissan people, except while celebrating the Satyanarayan or Satyapir Puja. The Bhoga offered then is called 'Shirini' which is Persian word, used by the Muslims while offering sweets after a Fateha. "Shirini" is always a sweet preparation. The small Muslim and Christian population has assimilated the food habits of the common people and there is nothing here called Muslim or Christian cusine.

Foreigners adopted the local food because it suited in this climate. The food is not too hot with rich spices. Turmeric, cumeri seeds, poppy seeds, curry leavs, chillies are the popular spices used. Ginger, garlic and onion is moderately used. Among beverages fresh plam juice, green coconut water are very popular in coastal areas. Intoxicating drinks are not popular except among the tribals. Rice been and Mahwa flower liquor are liked by them. Bhang, slightly intoxicating, grined to paste and mixed with milk or syrup is taken on festive occassions. During summer, juicy mangoes cooled in cold water is sucked. They are fresh and very refreshing. Bael fruit (Aegle marmelos) is another popular fruit for making cold drinks.

Principal, Food Craft Institute
Bhubaneswar

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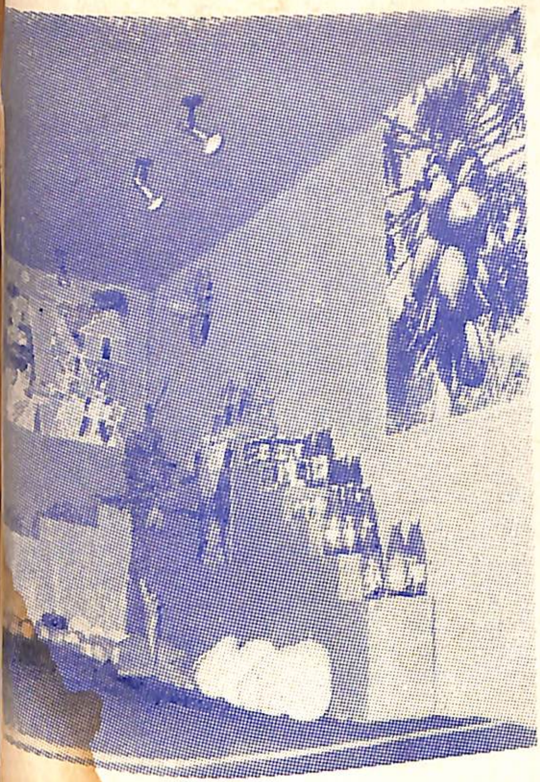
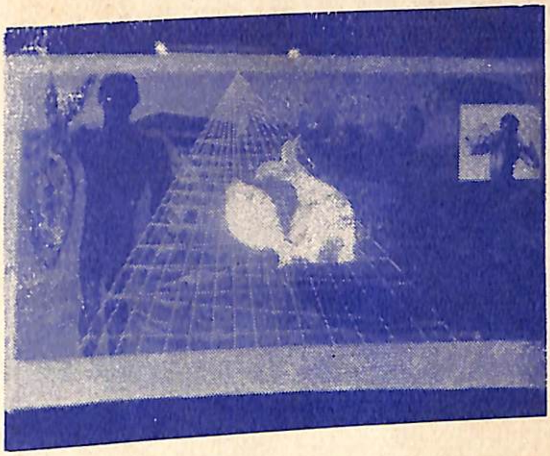
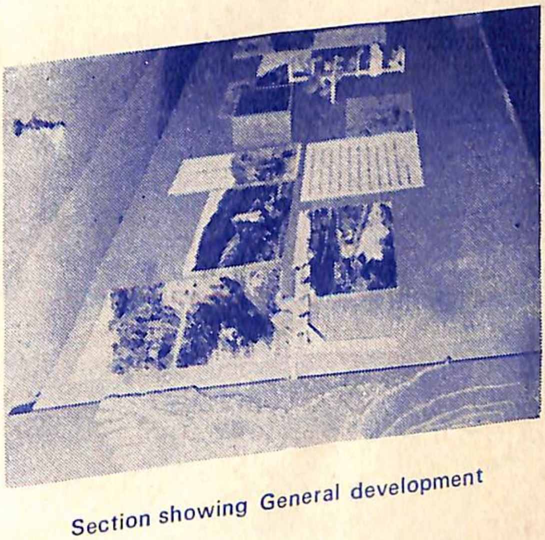


Exhibits of Agricultural Production



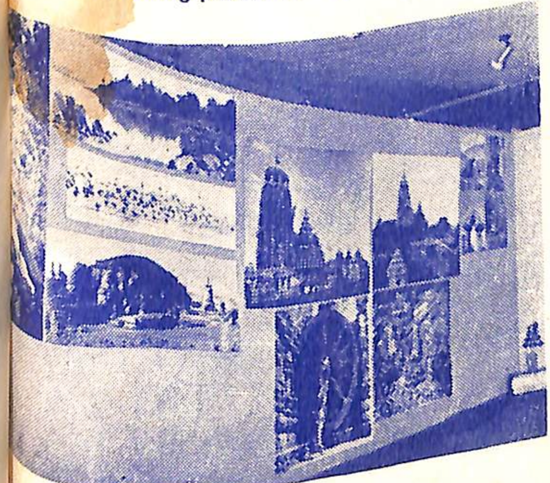
Fisheries Section

## GLIMPSES OF ORISSA PAVILION IN AGRI-EXPO' 1977



Section showing General development

A Section showing places of Tourist Interest



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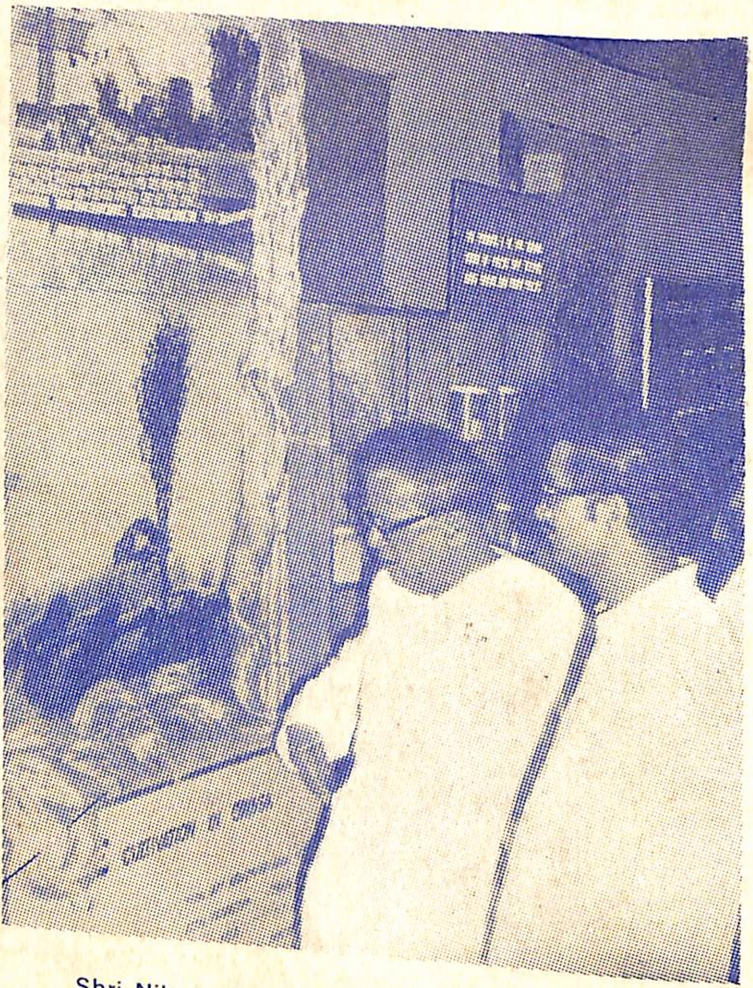
Front view of the Pavilion



Shri Nilamoni Routray, Chief Minister of Orissa visiting the Pavilion

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